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TECHNICAL REPORT

ANALYSIS OF AIRCRAFT EXHAUST EMISSION MEASUREMENTS

By: Leonard Bogdan and H.T. McAdams

CAL No. NA-5007-K-1

Prepared For:
ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF EMISSION CONTROL TECHNOLOGY
CHARACTERIZATION & CONTROL DEVELOPMENT BRANCH
ANN ARBOR, MICHIGAN 48103

Contract No. 68-04-0040
October 15, 1971

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FOREWORD

This report was prepared by Cornell Aeronautical Laboratory, Inc. (CAL), Buffalo, New York under Environmental Protection Agency (EPA) Contract No. 68-04-0040. The work was administered under the direction of the Office of Air Programs, Characterization & Control Development Branch, Division of Emission Control Technology, Mr. Barry D. McNutt, Project Officer.

This is the Phase I Technical Report that describes and summarizes the results of studies conducted during the period from June 1971 through September 1971 to translate field-measurement data on aircraft engine emissions into a format useful for the promulgation of realistic standards. The basic input data were supplied by the EPA.

The effort was performed jointly by the Vehicle Research Department and the Systems Research Department of CAL. Acknowledgement is made of the significant technical contributions to the program by P. A. Reese and G. D. Higgins who were responsible for computer programming. A special note of acknowledgement is in order for Mrs. A. Guendel, Mrs. S. J. Sweet and Mr. J. E. Blickenstaff who so ably performed the operational functions of data logging and transciption, curve fairing and related tasks. R. A Grom and his staff merit recognition for prompt and efficient response to digitization requirements in the context of meeting crucial program deadlines.

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ABSTRACT

An account is presented of the analytical procedures and data processing techniques employed in translating field-measurement data of aircraft exhaust emissions into a form consistent with the needs for the promulgation of realistic standards. Pollutant mass emissions for carbon monoxide (CO) hydrocarbons (HC) and the oxides of nitrogen (NO_x) are computed for an aircraft operational cycle comprised of the following modes: taxi/idle, take-off, climb out and approach. The calculations are for specific engine power (or thrust) settings for each mode as well as for specified times in mode. Numerical results are tabulated for each individual engine tested together with summaries obtained by aggregating engine data on a model basis. Data are presented for turboprop/turbine engines, light-utility piston engines and auxiliary power units.

LIST OF SYMBOLS[*]

CO = concentration of CO in exhaust, ppm

CO_2 = concentration of CO_2 in exhaust, o/o

F = mass rate of fuel flow, lb/hr

HC = concentration of hydrocarbons in exhaust, ppmC

M_x = molecular weight of "x" ($M_H = 1.008$

NO = concentration of NO in exhaust, ppm

NO_2 = concentration of NO_2 in exhaust, ppm

NO_x = concentration of NO + NO_2 in exhaust, ppm

w_x = mass emission rate of component "x", lb/hr

α = atomic hydrogen-carbon ratio of fuel

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[*] As used in equations in test of Part 1 of this report unless otherwise noted in the context.

Part 1

TECHNICAL REPORT

1.1 INTRODUCTION

The constituent components of the exhaust emissions resulting from aircraft operations include the same pollutants produced by highway vehicular traffic as well as certain other sources of pollutants, and thus play a similar role in the general air pollution problems. While aircraft exhaust emissions presently are considered to constitute a small portion of the total atmospheric pollution burden of a community (Ref. 1), the relative proportion of this burden is expected to increase in the future because of (a) the continuing development of technology for successfully decreasing emissions from highway vehicles and (b) the anticipated growth in the number of aircraft and aircraft operations in the next decade. It is the more tangible evidence of the aircraft emissions in the form of smoke and odors that has generated a reaction from the public. That aircraft exhaust emissions constitute a segment of the general air pollution problem that warrants a technically-based assessment is manifest.

Recognition of the dimensions of these problems at the federal level of government is reflected by the passage of an Act cited as the "Clear Air Amendments of 1970". This act specifically directed the initiation of a study to determine the effects of aircraft emissions on air quality, the technological feasibility of controlling such emissions and, finally, the issuance of proposed emission standards. In compliance with the last of these directives, the EPA instituted a broadly-based experimental program to measure the exhaust emissions from aircraft engines currently used in the commercial, military and general aviation sectors that comprise the aviation scene within the country. Auxiliary power units (APU) were also included within the scope of this effort. These basic or "raw" measurements consisted of data on emission concentrations together with pertinent information on engine maintenance history, engine settings and ambient conditions during test. These data were forwarded to CAL for processing and analysis directed to the ultimate objective of producing a statistical format conducive to the promulgation of realistic standards. Numerical specifications for typical operational landing-take-off (LTO) cycles for the various model engines were provided by the EPA.

Part 1 of this report discusses the methodology adopted at CAL for processing the input data and presents the rationale underlying the selection of the specific analytical procedures. The objective was to generate an output in the form of a set of best estimates, comprising a mean value supplemented by a measure of statistical dispersion, for emissions for specific engines, specific categories of operational modes and other applicable constraints. The end purpose of this analysis was the establishment of a rational basis for specifying engine exhaust emission standards. An additional objective involved the identification and possible isolation of the sources of variability in engine emissions and, to the maximum extent possible with the available data, the appraisal of the relative importance of the sources. Results of these latter studies will be incorporated in a separate report to be published during November 1971.

Summaries of the numerical data and the results obtained for light-utility piston engines, auxiliary power units and turboprop/turbine engines are included in Part 2. Because each of these engine categories required a unique analytical procedure in data treatment, a brief description of these procedures, together with pertinent observations, precedes the set of data sheets.

The test data presented represent a complete inventory of all of the pertinent information received by CAL.

1.2 METHODOLOGY OF DATA ANALYSIS

1.2.1 General Comments

The specific methods and details pertinent to the data processing and the analytical procedures that are described constitute an attempt to best adjust the methodology to the ultimate objectives and the nature of the input data supplied for processing. In this respect a learning cycle was involved with the methodology subject to adjustment as the results from the processing of the initial quantities of test data were assessed (the field data were received at CAL in a piecemeal fashion). The unique flexibility and advantages realized by virtue of those methods ultimately selected is made apparent in the succeeding discussion.

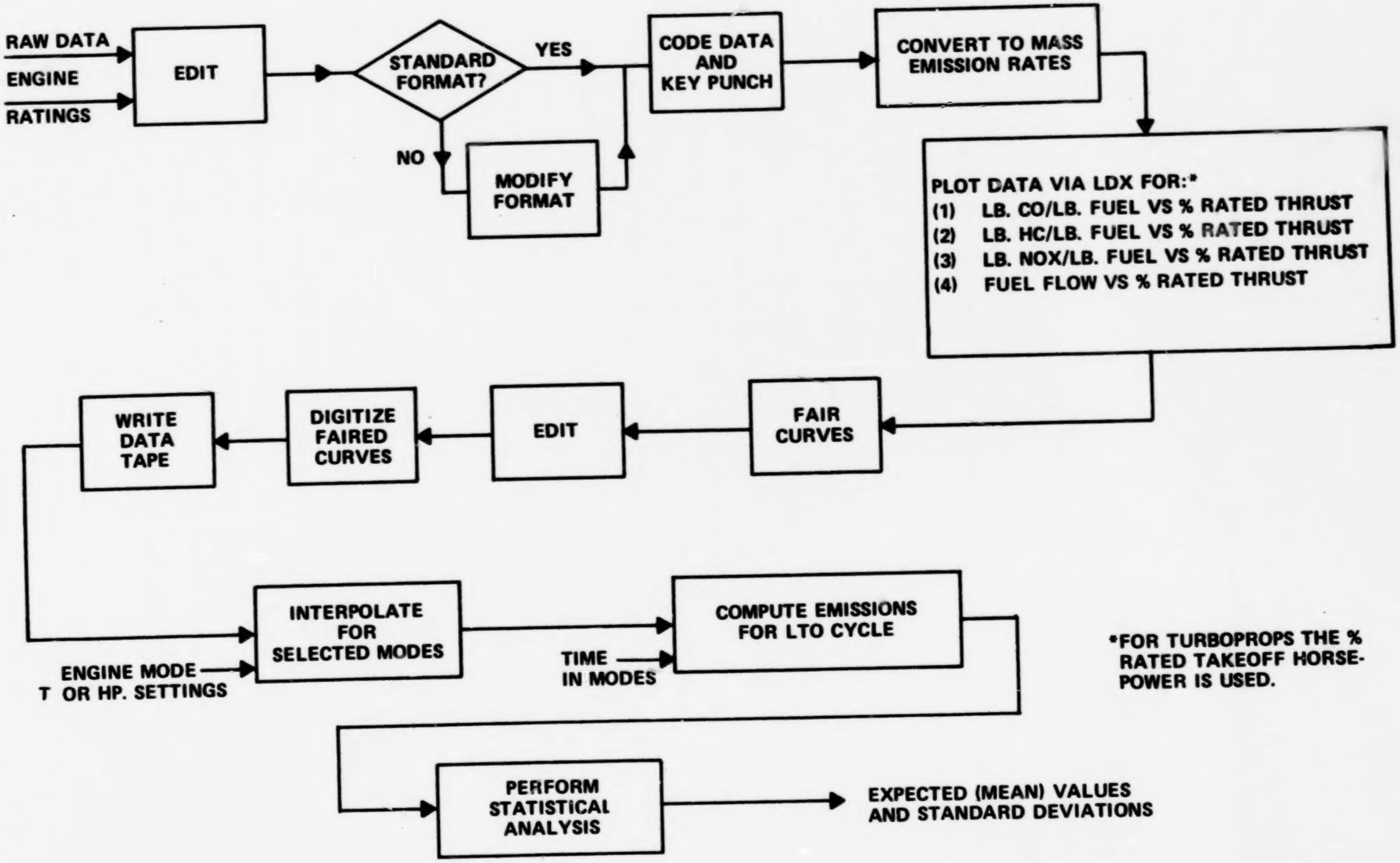
For reasons that will be clarified later, different methodologies for data analysis were required for each of the following categories of engines: (a) thrust turbines and turboprops, (b) piston engines and (c) auxiliary power units. Even within these general categories there were further variations in the manner of processing as dictated by the type of data which were provided. All of these factors are discussed in detail in their appropriate places in this report. Because of the high level of interest of the EPA in the commercial thrust turbines and turboprops, this engine category was the object of the most extensive data processing. Also, the major portion of all tests submitted for analysis were in this category. For example, this report contains data on a total of 392 engine tests comprised of 199 turbine/turboprop tests, 140 piston engine tests and 53 tests on APU's.

A concise overview of the entire set of operations comprising data processing and analysis is obtained by reference to the flow chart of Figure 1. In its entirety, this flow chart is applicable only to the analysis performed upon data for turboprop and turbine (commercial) engines. Certain portions of the flow chart operations were common to other engine categories as well (for example, data for all categories of engines was at least coded and keypunched). The following descriptive summary faithfully follows the sequence of the flow chart.

1.2.2 Detailed Procedures

Editing

Upon arrival at CAL, the primary data sheets were logged and examined for completeness of information, consistency of parameter dimensions and


RAW DATA
ENGINE
RATINGS
EDIT
STANDARD FORMAT?
YES
NO
MODIFY FORMAT
CODE DATA AND KEY PUNCH
CONVERT TO MASS EMISSION RATES
PLOT DATA VIA LDX FOR:*
(1) LB. CO/LB. FUEL VS % RATED THRUST
(2) LB. HC/LB. FUEL VS % RATED THRUST
(3) LB. NOX/LB. FUEL VS % RATED THRUST
(4) FUEL FLOW VS % RATED THRUST
FAIR CURVES
EDIT
DIGITIZE FAIRED CURVES
WRITE DATA TAPE
INTERPOLATE FOR SELECTED MODES
ENGINE MODE T OR HP. SETTINGS
COMPUTE EMISSIONS FOR LTO CYCLE
TIME IN MODES
PERFORM STATISTICAL ANALYSIS
EXPECTED (MEAN) VALUES AND STANDARD DEVIATIONS

*FOR TURBOPROPS THE % RATED TAKEOFF HORSEPOWER IS USED.

Figure 1 FLOW CHART – DATA PROCESSING AND ANALYSIS – TURBINE AND TURBOPROP ENGINES

reasonableness of the data. Where feasible, the necessary dimensional conversions and calculations were made; otherwise, missing information was obtained, if possible, by contacting the testing organization. A complete listing of testing organizations, the geographical location of the respective test sites and the types of engines tested at each is shown in Table 1.

At this stage of the process the rated take-off power or thrust setting for each engine was entered since, as will be demonstrated, this parameter represents the common base against which the exhaust emissions and engine fuel flow were plotted.

Format

As shown in the flow chart, the primary data supplied by the various test organizations were to have been presented in a standard format devised by the EPA. Standard format sheets for the turbine engines and piston engines are shown in Figures 2 and 3 respectively. In the majority of the cases, however, the data received departed in varying degrees from the standard sheet, both in format and in the actual data content supplied. For example, relevant information such as engine history data, data on ambient conditions and pollutant emissions often were lacking. Most troublesome of all were those numerous cases in which certain elements of information essential to data reduction and analysis were missing. As an example, thrust data was not always given for all test modes, and in some cases, CO_2 concentrations were not recorded. In addition, there were inconsistencies in the basis of reporting pollutant concentrations, whether wet or dry basis, whether hydrocarbons were recorded as methane or as carbon, and whether all units of measurement were consistent throughout. A significant amount of time and effort was consumed, therefore, in editing the received data, in attempting to retrieve missing information, and in modifying the format to a sufficient extent to make it compatible with established processing procedures.* In many cases, such

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*Keypunch operators had been pre-trained to work directly from data entered on the standard format sheets.

Table 1

SUMMARY OF SOURCES OF EMISSIONS MEASUREMENTS

TEST ORGANIZATION	TEST SITE	TYPE ENGINES TESTED	TYPE EMISSION MEASUREMENT
PRATT AND WHITNEY AIRCRAFT	E. HARTFORD, CONN.	JT3D, JT8D, JT9D - TURBINES (EXPERIMENTAL AND PRODUCTION TYPES)	ALL EMISSIONS - WET
DETROIT DIESEL ALLISON DIV.	INDIANAPOLIS, IND.	T56 (PRODUCTION TYPES) - TURBOPROPS	CO, CO_2, NO_x - DRY HC - WET
TELEDYNE-CONTINENTAL	MUSKEGON, MICH.	LIGHT UTILITY, GENERAL AVIATION - PISTON	CO, NO - DRY HC - WET
AIRESEARCH	PHOENIX, ARIZ.	AUXILIARY AND SMALL PROPULSION UNITS	ALL EMISSIONS - WET
BUREAU OF MINES	AMERICAN AIRLINES MAINTENANCE AND ENG'RG. CENTER TULSA, OKLA.	JT3D, JT8D, R-R SPEY - TURBINES	ALL EMISSIONS - WET
EPA TEAM	UNITED AIRLINES SAN FRANCISCO, CALIF.	JT3C, JT3D, JT4A, JT8D - TURBINES	ALL EMISSIONS - WET
SOUTHWEST RESEARCH INSTITUTE	KELLY AFB, TEXAS TWA, KANSAS CITY, MO.	T56 - TURBOPROPS, J79 - TURBINES JT4A, JT3D, JT8D, CJ805 - TURBINES	ALL EMISSIONS - WET ALL EMISSIONS - WET
SCOTT RESEARCH LABORATORIES	NORFOLK, NAS, VA. GENERAL AVIATION AIRPORTS	J52, J57, TF30 - TURBINES LIGHT UTILITY - PISTON	ALL EMISSIONS - DRY ALL EMISSIONS - DRY

Figure 2 a

AIRCRAFT EMISSIONS BASELINE DATA SHEET

Date:______________________________ Sheet No.________ of________ Sheets

Test Organization______________________________

Engine Supplier______________________________

Individual in Charge______________________________

Engine Data:

Engine Serial No.*____________________ Engine Type and Model____________________

Engine Total Time, hrs.______________________________

"Time Since Hot Section Overhaul," hrs.**______________________________

Time Since:

N_1 Compressor Overhaul, hrs.______________, N_2 Compressor Overhaul, hrs.______________,

Combustor Can Replacement, hrs., (indicate part number)__________, First Stage Nozzle Guide Vane

Overhaul, hrs.______________, N_1 Turbine Overhaul, hrs.______________, N_2 Turbine

Overhaul, hrs.______________________________,

Fuel____________________ Fuel H/C Ratio____________________

Operational Data:

Inlet Air Temperature, °F: Start______________, Finish____________________

Atmospheric Pressure: Start______________, Finish____________________

Inlet Air Humidity, lbs. H_2O/lb. dry air______________________________

Relative Humidity______________________________

Sample Line: Temperature, °C________, Flow rate, liters/min____________________

Sample Line Transport Time, sec.______________________________

*Attach engine history sheet as appropriate.

**A.A. – Time Since Hot Section Inspection, TWA – Time Since Hot Section Maintenance, U.A. – Time Since Engine Heavy Maintenance, also may refer to time since hot section was brought to "zero" time; give your interpretation of your entry as necessary.

Comments:

Figure 2 b

Test	Time	Mode	Power		Engine Speed (RPM)		Measured Fuel Flow (lb/hr)	Gas Generator Air Flow (lb/sec)	Calculated F/A	Compressor Discharge Temp. (^{o}F)	Engine Pressure Ratio, EPR	Turbine Inlet Temp. (^{o}F)	Exhaust Gas Temp. T_{T_7} (^{o}F)	Exhaust Gas Pressure, P_{T_7} psia
			Thrust, lbs. or Shp.	% Max.	N_1	N_2								

Figure 2 c

CO (Wet)	CO_2 (Wet)	THC (Wet)	NO (Wet)	NO_2 (Wet)	NO_x (Wet)	Aldehydes (Wet)	Smoke	Particulates
ppmV	%V	ppmV C	ppmV	ppmV	ppmV	ppmV		

Figure 3 a

AIRCRAFT EMISSIONS BASELINE DATA – PISTON ENGINES

Date:____________________ Sheet No. ________ of ________ Sheets

Test Organization ____________________

Engine Supplier ____________________

Individual in Charge ____________________

Engine Serial No.* ____________________ Engine Type and Model ____________________

Engine Total Time, hrs. __________ Time Since Last Engine Overhaul, hrs. ____________________

Fuel ____________________

Inlet Air Temperature, ^oF: Start __________, Finish ____________________

Atmospheric Pressure: Start __________, Finish ____________________

Inlet Air Humidity, lbs. H_2O/lb. dry air ____________________

Relative Humidity ____________________

Sample Line: Temperature, ^oC __________ Flow Rate, liters/min ____________________

Sample Line: Transport Time, sec. ____________________

*Attach engine history sheet as appropriate.

Comments:

Figure 3 b

Test	Time	Mode	Carburetor Heat	Power % Max.	Engine Speed (RPM)	Intake Manifold Pressure (in. Hg)	Measured Fuel Flow (lb/hr)	Air Flow (lb/hr)	Calculated F/A	Exhaust Gas Temp., (°F)	CO (Wet)	CO_2 (Wet)	THC (Wet)	NO (Wet)	NO_2 (Wet)	NO_x (Wet)	Aldehydes (Wet)
											ppmV	%V	ppmV C	ppmV	ppmV	ppmV	ppmV

modification was not possible; a complete transcription of the data into standard sheets was necessitated.

Coding and Key Punching

Once the data were edited to a sufficient extent to be useable in the analysis process, these data had to be coded and key punched for entry into subsequent computer processing. Coding consisted of such matters as assigning serial numbers to engine models, fuel types, testing organizations and engine suppliers by which they could subsequently be identified, identifying the various pollutants by an appropriate code, and assigning a sequence of numbers to the various power settings in a test in such a way that the several test points could retain their time sequence identity in subsequent processing. In addition pertinent comments related to the particular test (such as presence of retrofits on the engine, use of fuel additive, unusual test problems, etc.) were encoded. The data was then key punched in a format which allowed retrieval of substantially all the information received from any one test organization.

Conversion of the Data

As seen by reference to the data sheets shown in Figures 2 and 3, all of the pollutant emissions were given in terms of concentrations, either as parts per million by volume or as a percentage volume. A more useful and meaningful quantity for data analysis is the mass emission rate of the pollutant.

Equations for converting concentration data into mass emissions data were derived from the basic chemical equation for the combustion of a hydrocarbon fuel in air. The details of this derivation will not be included in this report. Instead, only the final conversion formulae will be documented with the observation that they are in general accord with those given in Ref. 2. The pertinent equations are listed below:

$$\omega_{CO} = \frac{M_{CO} \frac{CO}{10^4} F}{(M_C + \alpha M_H)\left(\frac{CO}{10^4} + CO_2 + \frac{HC}{10^4}\right)} \tag{1}$$

$$\omega_{HC} = \frac{M^*_{HC} \frac{HC}{10^4} F}{(M_C + \alpha M_H)\left(\frac{CO}{10^4} + CO_2 + \frac{HC}{10^4}\right)} \tag{2}$$

$$\omega_{NO_x} = \frac{M_{NO_2} \frac{NO_x}{10^4} F}{(M_C + \alpha M_H)\left(\frac{CO}{10^4} + CO_2 + \frac{HC}{10^4}\right)} \tag{3}$$

$$\omega_{CO_2} = \frac{M_{CO_2} CO_2 F}{(M_C + \alpha M_H)\left(\frac{CO}{10^4} + CO_2 + \frac{HC}{10^4}\right)} \tag{4}$$

The above equations were programmed for the IBM 370/165 computer to perform the data conversion. To utilize these particular equations, the emission concentrations must be expressed on a wet (or actual) concentration basis. Since some of the input data received were measured on a dry basis (see Table 1 for details), appropriate corrections to these data were necessary. Correction simply involves the multiplication of the dry concentration data by a correction factor to obtain the required wet concentration data. The appropriate equations that define the correction factors are listed below:

a. CO and CO_2 are measured on a wet basis, NO on a dry basis and NO to be converted to a wet basis
(K = correction factor)

$$K = \frac{100 - \frac{\alpha}{2}\left(\frac{CO}{10^4} + CO_2\right)}{100} \tag{5}$$

---

[*] In this report the hydrocarbon mass emissions are always given in terms of methane, M_{HC} = 16.04.

b. All measurements are on a dry basis

$$K = \frac{100}{100 + \frac{\alpha}{2}\left(\frac{CO}{10^4} + CO_2\right)} \qquad (6)$$

In both cases, the correction is for the water of combustion.

One observation common to all of the preceding equations is that the carbon dioxide component is overwhelmingly dominant in terms of the concentrations and mass rate emissions among all the effluents.

Data Plotting

Following the conversion of CO, HC and NO_x concentration data to mass emission rates, a set of four plots was made for each turbine and turboprop engine tested by means of Long Distance Xerography (LDX).

The Xerox LDX plotter is basically a combination of the Xerox process (light-sensitive electrostatic drum) and a flying-spot scanner. The beam of the cathode-ray tube in the LDX plotter has discrete beam locations addressable in two coordinates. The output of the plotter is recorded on paper strip 8-1/2 inches wide. The usable width for recording purposes is 7.82 inches. This width accommodates 1024 discrete addressable locations separated by 1/131 inch. Along the length of the paper strip, the same distance between addressable locations applies, but recording can be carried out continuously up to a total length of 2000 feet, the length of the roll of paper. In practice, the paper is usually cut into 11-inch lengths to provide standard-sized 8-1/2 inch by 11-inch sheets. For present purposes it was found convenient to use a standard 5-inch by 5-inch plot and to scale the data in such a way as to conform to this standard format. For thrust-rated engines, each measured thrust value in the test was expressed as a percentage of the take-off thrust rating for the engine, and these normalized thrust values were used as the abscissae for the LDX plots. Three of the plots in the series employed pounds of pollutant per thousand pounds fuel as ordinates. The other one showed the relation between thrust and fuel flow. By means of the LDX process, the points were plotted and displayed very rapidly. Continuous curves were faired (manually) to these points for subsequent interpolative use. One major advantage of this approach was that the plots made evident any discrepancies in the data and thus introduced an additional control on the quality of the data included in the final analysis of emissions. This approach also provided a means whereby engineering judgment could be brought to bear on the problem, especially where data were sparse in some regions of the curve. Purely analytical methods such as least-squares curve fitting would not have permitted this interpretive process.

Curve Fairing

Fairing of the LDX plots was purely a manual procedure. The normal process involved a visual scanning of a large quantity of plots for a given type engine to help define the general shape of the various curves. This knowledge proved useful in the fairing process in those test situations where data points were sparse, missing or poorly spaced. The plots for HC and CO generally approximate an equilateral hyperbola with a sharp "knee" just above the idle/taxi thrust settings. Unfortunately much of the initial test data obtained had very few points in this critical region in the 10% to 30% range of rated power or thrust.* By relying on data from those test runs where adequate data were available to reliably define the shape of the entire curve, it was possible to fair (and use) the data from tests where a poor spacing of the data points existed. In addition, random data points widely divergent from the normal trend of the bulk of the data were excluded by the fairing process. These points were first checked to ascertain they were not influenced by an processing errors.

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*This information was relayed later to the EPA who in turn requested the test organizations to take measurements in this region of power settings. Accordingly some of the later data received provided LDX plots that were very well defined in all regions of the curve.

Digitizing of the Faired Curves

With the fairing of curves to the points plotted by LDX, a means was available for interpolating emission rates for any desired thrust ratio. Also by virtue of the fuel flow versus thrust curve, pounds of emission per pound of fuel could be converted to pounds of pollutant per hour for each of the interpolated points. In order to extract these quantities from the curves, however, it was necessary to read the curves for each desired input datum.

At this point in the analysis, several options were available. The curves could have been read, for example, with or without mechanical aids; moreover, the curves could have been read only at those values of thrust or power associated with a particular operational mode, or they could have been read at a number of points in consideration of any future changes in the definition of the operating modes. In the interest of flexibility, it was decided that the curves should be read at a sufficient number of points to permit them to be approximated by connecting straight-line segments. Accordingly, for the CO, HC and NO_x curves, twelve points were read from each of the faired curves. These points were closely spaced in regions of the curve exhibiting high curvature and spaced relatively far apart in regions of the curve which were approximately linear. Because the fuel flow vs thrust curves were monotonic and exhibited relatively little curvature, it was concluded that they could be well approximated by fewer straight-line segments. Hence these curves were only read at five points. Samples of the faired LDX plots showing the points at which the curves were read are shown in Figure 4. These figures represent a complete set of plots for a test run identified as CAL ID No. 393. The alphabetical sequence of the letters (and progression of other symbols) preserves the original chronological order in which the test points were taken. Precise location of the original data point input represented by each letter (or symbol) is at the lower left-hand corner of the symbol in each instance.

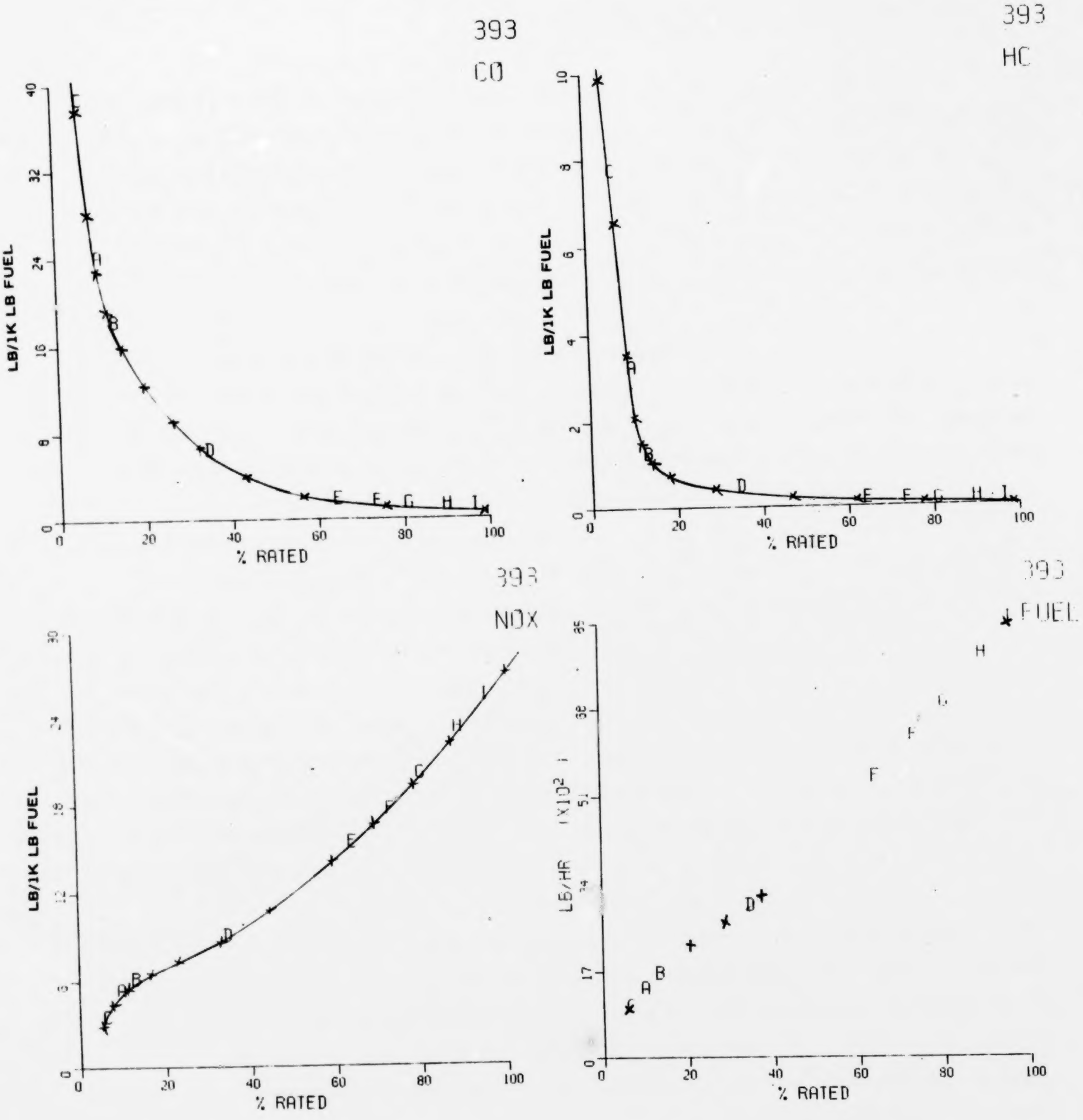

Figure 4 TYPICAL SET OF FAIRED LDX PLOTS FOR A TEST

The sample plots represent one of the better sets of data in that there are an adequate number of well-spaced test points. Each curve was read at that point marked with an 'x' as shown.

To facilitate curve reading, a Calma Model 303 Digitizer[*] was used. The Calma digitizer reduces graphical analog data to digital magnetic tape for subsequent computer processing and analysis. The equipment consists of the console, a backlighted tracking bed, balanced torque-motor chart drive, stylus-carriage assembly, direct digital pick-off mechanism, data and control electronics frame and an output incremental tape drive.

To digitize graphical analog data directly on magnetic tape, the operator traces the analog plot with a movable stylus/carriage assembly. As the plot is traced, movement of the stylus in either the X or Y direction causes pulses to be generated by the direct digital pick-off mechanism. For purposes of this program, the device was operated in its single-point mode. By locating the stylus on each of the points to be read,[**] the operator could rapidly and efficiently record the X, Y coordinates of the curve points for subsequent use in the interpolation process.

To evaluate the repeatability of the digitizing process, one of the plots was read in duplicate. A comparison of the results of the two sets of coordinates is shown in Table 2. As can be seen, the maximum difference between duplicate readings is considerably less than 1% of full scale.

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[*] The Calma Company, 346 Mathew Street, Santa Clara, California.

[**] These points were pre-marked as a part of the fairing process.

Table 2

REPEATABILITY OF DIGITIZING PROCESS

Run #1		Run #2	
x	y	x	y
6.40	4.69	6.40	4.68
7.20	3.71	7.00	3.71
9.20	3.05	9.40	3.05
11.00	2.53	11.00	2.54
14.80	1.93	15.00	1.93
20.80	1.93	20.40	1.44
29.20	0.97	29.00	0.99
43.40	0.53	43.40	0.53
52.80	0.37	52.80	0.37
58.20	0.32	58.20	0.31
76.00	0.14	76.00	0.13
99.40	0.08	99.20	0.08

Interpolation for Selected Modes

After the curves were faired and digitized, the data were loaded on a computer tape and the tape processed by a program which interpolated for selected operating modes for each engine. Mode selection, time-in-mode information and the corresponding engine settings were supplied by the EPA. The following modes were specified: taxi/idle, take-off, climb-out, approach and taxi/idle. Climb-out and approach times correspond to those associated with operations below an altitude of 900 meters above ground level. Engine settings for turboprops were given in terms of a percentage rated take-off horsepower while those for thrust-type turbines were in terms of percentage rated take-off thrust.

By virtue of the available plots, now stored in the computer and accessible by interpolation, specified percentage rated thrust values were then used as the basis for interpolating mass emission rates for CO, HC and NO_x as well as the fuel mass rate. These rate values, when combined with the given times in mode, made possible the computation of the total mass of emissions for a typical landing-take-off (LTO) cycle.

The engine power settings initially were subject to changes by the EPA to permit an evaluation of the effects of such variations within the operational modes on individual and aggregated mass emissions of pollutants. One of the salient features of the data processing procedures adopted is the ease of accommodating such changes of input. Engine settings used in the processing of the turbine/turboprop data to establish the so-called "base line" from which proposed standards were promulgated are given in Figure 6 of this report.

A significantly different procedure was employed for processing the piston engine data, which came from two independent sources (as shown in Table 1). This cahnge in method was necessitated since these sets of data were incompatible with each other and with the turbines from the data processing standpoint. Specifically, the one set (Continental Teledyne) lacked CO_2 measurements while the other (Scott Research Laboratories) lacked horsepower data for the various engine power settings. The auxiliary power units comprised a distinct category apart from the other engines and were accorded separate treatment.

1.3 STATISTICAL ANALYSIS

Outputs from the overall assessment were subjected to only a routine statistical treatment during this first phase of the program. Identifiably different engine types and models were separated into individual groupings. For the set of engines pooled within each group, mean values and standard deviations from the mean were computed for various engine operational parameters and pollutant quantities for each mode. Specific details concerning these quantities are included in the next section of the report. Standard deviations were computed on a "best estimate" basis by applying the theory of small number statistics. In essence, this involves using the quantity N-1 as the divisor of the sums of squares (N = number of samples summed).

A more thorough statistical treatment of these data will be conducted during the second phase of this program. A report of this study will be published during November 1971. The objective of this analysis will be to attempt to identify and isolate those factors which contribute significantly to the variance in the data and to define the relative magnitude of the contribution of each.

1.4 PRESENTATION OF RESULTS

All of the numerical data presented in the report are in the form of computer print-out data sheets. Each engine test for which data were received has been included in the listing. In all cases the data for each engine test have been processed to the maximum extent possible (i.e., each mode in the LTO cycle appropriate to that engine as well as the aggregation of the emissions over the entire cycle). In those cases where insufficient data are provided to permit complete processing, the emission data are converted from a concentration basis to a mass emission basis. On the other hand, when engine fuel flow data are unavailable, the conversion to mass emissions is not possible and the test organization's raw measurement results are simply reproduced.*

The general format employed on the computer print-out sheets is specified by the EPA. The data given for each engine test include the test information received as well as the results of the data analysis procedures. Input data is reproduced following the general guidelines of the standard EPA data sheets (Figures 2 and 3), and, in substance, includes almost all of the data initially supplied by the testing organization.*

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*Only about 2% of the data are included in this category.

Following this "replay" of the input data, the calculated mass emissions data are tabulated for each engine power setting of the test sequence. These data are expressed as mass pollutant per 1000 lbs fuel, mass pollutant per hour and mass pollutant per 1000 horsepower-(or thrust) hours (when CO_2 measurements are available, similar data are given for CO_2 although it is not classified as a pollutant).

The final tabulation of data is that for the emissions for the LTO cycle for that engine. Data format provided by the EPA for these data is shown in Figure 5. For the turbine/turboprop engine category the EPA also provided the following data for each model (note that the initial idle/taxi and final idle/taxi modes are treated as distinct and separate parts of the LTO cycle): engine power setting, useage weighting factor and time in mode. Numerical specifications for these quantities are given in the commentaries pertinent to each data set.**

Piston engines were tested at power settings corresponding to various nominal modes (the number of modes generally being a larger number than that given in Figure 5). As a consequence, with EPA concurrence, the modes corresponding to the EPA LTO cycle were directly selected from the testing organizations test sequence (no interpolation on power settings was done as for the turbine/turboprop category). In this case, the EPA provided only specifications for weighting factors and times in mode (no power settings).

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* Some testing organizations, which did not use the standard data forms, provided additional engine parameter data not required for present data processing purposes. In such cases not all of these inputs are reproduced.

** In the context of this report the following data sets are recognized: turbine/turboprop, piston engine (Scott), piston engine (Continental), APU.

MODE	POWER SETTING	POWER OUTPUT	EMISSION RATE	FUEL RATE	USEAGE WEIGHTING FACTOR	TIME IN MODE	POLLUTANT MASS	FUEL MASS	#POL/ 1000 # FUEL	ENERGY OUTPUT	# POL / ENERGY OUTPUT
TAXI/ IDLE											
TAKE-OFF											
CLIMB-OUT											
APPROACH											
TAXI/ IDLE											
TOTAL FOR CYCLE											
# POLLUTANT/1000 # FUEL/CYCLE											
# POLLUTANT/1000 # T-HR/CYCLE											
# POLLUTANT/1000K # T AT T.O.											

Figure 5 LTO CYCLE EMISSIONS - EPA FORMAT SHEET

The arrangement of the data within the data sets groups the engines by model. Following each group is an aggregated summary of the LTO-cycle emissions for this model engine. The number of engines included in each summary is shown at the top of the summary sheet. Since the summary accounts show means and standard deviations in each of the tabular columns, engines that did not have complete data (e.g., HC or CO was missing or possibly a mode was missing) are not included in the summary because of the distortions that would be thereby produced in the results.

As per instructions, all emissions data for the military turbine engines are converted into a mass basis. Data for the auxiliary power units are also on a mass basis. An additional calculation is made for the APU's (where applicable) to determine the so-called "air power" for those units operated with air bleed loading. This quantity is added to the shaft horsepower (if any) of the unit to provide a measure of the total energy output.

It is important to note that the mass emissions of the hydrocarbons are in terms of methane while those for nitric oxides (NO_x) are in terms of NO_2. This useage is consistent throughout this report.

1.5 DISCUSSION

To date the principal function of CAL in this program has been in coordinating and consolidating the mass of field test data, in developing suitable data processing procedures and, finally, in processing the raw data in accordance with guidelines supplied by the Office of Air Programs of the EPA. There has been no requirement or intent to draw conclusions or inferences from the final results that have been obtained. Rather the objective of this report is to present the raw data input, describe the details of the data processing procedures and to present the results. Thus the substance of this section of the report is devoted to generally clarifying sundry background details concerned with data handling and to explanatory comments related to the tabulated data.

Despite the somewhat circumscribed role of CAL in this program (as described above), CAL's view of its overall function has been broader than mere calculations of the results of engine emission tests. CAL has believed an analysis of data must proceed within a framework that includes an engineering awareness and understanding of the real world within which the test results have been obtained. Accordingly, very early in the program (29 June 1971), project personnel visited Pratt & Whitney Aircraft to observe testing operations in progress and to discuss operational and instrumentation details with cognizant personnel. This trip was extremely valuable in providing the "real world" background within which the data transmitted for analysis had been obtained.

The ultimate purpose of the data processing was to obtain results for the emission of each engine for the complete LTO cycle in accordance with Figure 5. A listing of the specific information provided by the EPA to accomplish this purpose is given in Figure 6. Engine operating cycles, as supplied by EPA, have been constructed based on time-in-mode considerations of high activity periods at major air carrier airports. The first taxi-idle mode is defined to include the total time between propulsion engine start-up and the initiation of the turn into the runway. The take-off, climb-out and approach modes approximate the times spent in these modes. The last taxi-/idle mode includes the taxi/idle time between termination of the landing run and final shutdown of the propulsion engine. Both the time-in-mode and power setting information was obtained by the EPA from engine manufacturers, air frame manufacturers, the airlines and the FAA. The weighting factors are the fraction of the propulsion engines operating on a given aircraft in any given mode. Results obtained from processing the data in accordance with the requirements of Figure 6 are presented in Tables I, II and IV. This set of results constitutes the aircraft emissions baseline data. Summaries obtained by aggregating all engines of a given model are included also.

The basic emissions data was reprocessed a number of times using power settings and weighting factors different from those given in Figure 6. These inputs, provided by the EPA, were designed to evaluate the effects of

Figure 6

SUMMARY OF EPA INPUTS EMPLOYED FOR LTO-CYCLE EMISSION CALCULATIONS

	CLASS T1			CLASS T2			CLASS T3			CLASS P1		
	TURBOPROPS/TURBINES			TURBINES			TURBINES			LIGHT UTILITY PISTON		
MODES	POWER SETTING % RATED	W.F.	T.I.M.	POWER SETTING % RATED	W.F.	T.I.M.	POWER SETTING % RATED	W.F.	T.I.M.	POWER SETTING % RATED	W.F.	T.I.M.
FIRST TAXI/IDLE	T56 = 3% AIRESEARCH = 6%	1	19	CJ805 = 4%, JT3C = 5% JT3D = 5%, JT4A = 5% JT8D = 6%, SPEY = 4%	1	19	JT9D = 7%	1	19	*	1	12
TAKE OFF	100%	1	0.5	100%	1	0.7	100%	1	0.7	*	1	0.3
CLIMB	90%	1	2.5	85%	1	2.2	85%	1	2.2	*	1	5.0
APPROACH	30%	1	4.0	40%	1	4.0	30%	1	4.0	*	1	6.0
LAST TAXI/IDLE	T56 = 3% AIRESEARCH = 6%	1	7.0	CJ805 = 4%, JT3C = 5% JT3D = 5%, JT4A = 5% JT8D = 6%, SPEY = 4%	1	7.0	JT9D = 7%	1	7.0	*	1	4.0

W.F. = USEAGE WEIGHTING FACTOR

T.I.M. = TIME IN MODE, MINUTES

*NOT SPECIFIED, MODE DATA WAS SELECTED DIRECTLY FROM TEST ORGANIZATION'S SCHEDULE OF TEST MODES AS GIVEN ON DATA SHEETS operational changes on emissions. Table V presents model summary data for the turboprop/turbine category generated by using altered weighting factors and power settings. This data represents a recomputation of the baseline data, taking into account possible ground operational changes. The tables reflect what the emissions would be for those engines normally used on 3 engine aircraft if one engine was shut off during both taxi/idle modes (2/3 weighting factor) and the power output of the remaining engines was increased 50% to maintain total aircraft power at the same level. For engines normally used on 2 or 4 engine aircraft the tables reflect what the emissions would be if 1/2 of the engines were shut off during both taxi/idle modes (1/2 weighting factor) and the power output of the remaining engines was increased 100% to keep the total aircraft power at the same level.

A few comments on grouping within models are appropriate. Special treatment was accorded the JT8D models as per directions. The JT8D engine is somewhat unique in that the by-pass airflow and the combusted exhaust gases exit through a common duct. Mixing of the exhaust gases with the bypass airflow was found to occur at engine idle settings resulting in dilution of the sampled gases when the nominal multi-probe gas sampling configuration was ued. To combat this problem Southwest Research Institute (SWRI) measured emissions of the JT8D engines in the idle mode using a single axial probe (Ref. 3). Thus all SWRI JT8D data has been treated as "undiluted" and all other JT8D data as "diluted".

Another factor unique to JT8D engines is the presence of smokeless combustor cans (retrofits) on some of the older models. These are identified by remarks of the test organization under the "comments" section of each engine data sheet. Thus Table IV has four separate summaries for the JT8D model: diluted-ordinary, diluted-smokeless, undiluted-ordinary, undiluted-smokeless.

A separate grouping was also accorded the T56-A7 and the T56-A15 turboprop engines. The former represent overhauled engines tested at Kelly AFB by SWRI while the latter are new engines tested by the manufacturer, Allison.

In all cases, model groupings exclude engines which lack complete data (either missing data on one of the pollutants, or, in the case of piston engines, a missing mode). Their inclusion would bias and distort the means and standard deviations computed for each model.

Reference to the data sheets will show that in some cases data were measured on aldehyde concentration, smoke index and particulates. These data were not processed and are simply reproduced for completeness. Analysis of these quantities was performed by the individual testing organizations and the results are included in their respective final reports. These final reports should be consulted for specific details concerning the background of the emissions concentration data which have been processed on this program.

In general, that portion of the tabulated data for each engine that corresponds to input information from the test organization, has been reproduced without change. In some cases the units of certain quantities were changed to preserve consistency among the data sets and in others approximate values were estimated. For example, H/C information was not often provided on the data sheets since the fuel had not been analyzed in situ.* CAL-estimated values would therefore be inserted to permit data processing. An H/C value of approximately 2 was used for turbine fuel.

Relative humidity and temperature at the test sites were usually given but not the corresponding specific humidity (lbs water per lb dry air). In these circumstances the specific humidity data, as read from a graphical presentation (Ref. 4), were entered.

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*SWRI provided an initial measured H/C value for tests at TWA. Since this value (1.722) seemed too low, CAL chose to ignore this figure and used a value of 2.02. Later SWRI notified CAL that a reappraisal indicated a value of 1.968 for H/C. Since these two values were so close and time so critical, the H/C ratio was not changed.

Averaged data were used if a range of values for ambient parameters was given. For example, the Bureau of Mines reported sizeable variations in the sample line temperature during test operations (of the order of 70°C). The figure given is the arithmetic mean of the extremes.

In the tabulated data, all missing, unavailable or non-measured information is denoted by -0.00 to differentiate it from a true measurement which is actually zero. Concentration measurements shown as a true zero represent a value of less than one part per million.

No mode-type operational data for military engines was provided; consequently only the conversion to mass emissions was made. The T56 turboprop, although a military engine, is considered to be equivalent to the 501 civil version and hence was used in the baseline calculations.

The Office of Air Programs conducted a program of span gas checks at each of the test sites to gain assurance that there were no large discrepancies among these test organizations attributable to poor quality calibration gases or poor sampling techniques. Results of these tests are given in Appendix A.

In the preparation of this report, every possible effort has been made to eliminate errors in data transcription, conversion of pollutant concentration data to mass emission form, and calculation of pollutant burden over the LTO cycle. In view of the stringent time constraints of the program, however, it will be appreciated that it is virtually impossible to guarantee that the report will be error free. If a particular entry appears out of context, therefore, it may need to be validated by checking with the original data source.

The methods employed to reduce the concentration data to mass emission form and to calculate the pollutant burden over the LTO cycle were selected as the most reasonable and timely within the constraints of the program. We recognize, however, that there will undoubtedly be instances in which the reader may wish to depart from the methods employed in the report or to undertake an alternative analysis for specific purposes. It is for these reasons that we have provided, wherever possible, the raw input concentration data as well as the data in mass-emission form.

In the case of the turbine engines we have employed a computer-aided graphical technique to interpolate emissions at specified power or thrust values. Such interpolation suffers from the limitations of all interpolative procedures in that a certain arbitrariness is involved in extending the results obtained from a limited number of test points to situations in which actual observations were not available. Unfortunately, the engine operating condition most subject to this type of error is the taxi/idle mode with its attendant heavy influence on the total emissions calculated for the LTO cycle. In many instances, the taxi/idle mode as actually run in the test is at a higher percentage of rated power or thrust than is called for by the EPA-designated LTO cycle (see Fig. 6). In these cases, it was necessary to extrapolate to the desired power or thrust setting. Such extrapolation is difficult at best and, in the present analysis, was often further aggravated by lack of test points in the critical "knee" of the CO and HC curves at engine settings slightly above taxi/idle values. The only recourse under these circumstances is to rely on engineering judgment or to invoke mathematical conventions, such as regression analysis, which may be equally arbitrary. For final arbitration of this question, the reader may wish to make his own interpolations from either the raw concentration data or the data as converted to mass emission form, both of which have been provided in the report. The method of analysis employed in this report is not claimed to be absolute any more than any other interpolative procedure can make such claim.

As has been previously pointed out, a major advantage which can be claimed for the computer-aided graphical analysis is the speed with which data may be manipulated in compliance with changes in the questions to be answered by the data base. For example, if it is desired to know the effect on emissions of a change in ground-operation tactics, the relevant information can be quickly and efficiently retrieved from the data. The same facility is available as a means for checking the accuracy of the plotted data. By virtue of the accessibility of the digitized curves in the computer, the original curves could be "reconstituted" and visually scanned for possible errors. In addition to performing this error check, we also performed an extrapolation check in that region of the pollutant curve where it was necessary to extrapolate in order to obtain mass emissions for the taxi/idle mode. It is for these reasons that the results for the LTO cycle can be reported with considerable confidence.

1.6 SUMMARY

Experimental data consisting of concentration measurements of pollutants in the exhaust gases generated by turboprop and thrust turbine aircraft engines, light-utility piston aircraft engines and auxiliary power units have been processed, wherever applicable and possible, to establish mass emissions over specified landing-take-off (LTO) cycles. These experimental data and the LTO cycle specifications were furnished by the Office of Air Programs, EPA and the intent of the processing was to provide baseline data with the view of promulgating emission standards.

Processing of the data for commercial engines in the turboprop/turbine category was designed to permit calculation of pollutant mass emissions over an entire LTO cycle where the engine power settings could be arbitrarily specified. This purpose was achieved by graphically establishing a functional relationship between mass pollutants/unit fuel consumed and percent rated power for each individual engine. Thus by interpolation techniques, emissions corresponding to any desired engine power setting could be determined. This capability permitted evaluation of the effects of changes in engine operating cycles on mass emissions over the LTO cycle (compare engine model summary data between Table IV and Table V).

In contrast to the situation for the turboprop/turbine engine category, the piston engine emission data were measured under conditions of very uniform consistency between engine power setting and engine operational mode. LTO cycle emissions for this class of engines were computed by using the measured in-mode concentration measurements. No interpolative routines were necessary.

Military turbine engine emissions data were only converted from a concentration basis to a mass emission basis. No LTO cycle criteria were defined for these engines.

Auxiliary power units represent a distinctly unique source of exhaust pollutants within the context of the types of aircraft engines tested. Only the mass emissions for each power setting employed in the test sequence are given. Total horsepower loading for each unit is given by calculating the power associated with air bleed loading (as contrasted with shaft power loading) wherever appropriate.

All of the pertinent data on each engine tested and supplied to CAL has been reproduced in this report.

All of the emissions data has been processed to the maximum extent possible within the constraints imposed by the available supporting information and the requirements of the Office of Air Programs. A total of 392 engine test runs are reported. This total includes 199 turboprop/turbine engines, 140 piston engines and 53 auxiliary power units.

1.7 REFERENCES

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Appendix A

SPAN-GAS CHECKS OF TEST ORGANIZATIONS INSTRUMENTATION

Seven span gas cylinders were analyzed by three of the laboratories involved in the aircraft baseline emission. These initial checks were made at those aircraft study laboratories located in the Western half of the country; EPA (T&EB Mobile) at Phoenix (AiResearch), Southwest Research Institute (SWRI) at San Antonio (Kelly AFB) and Bureau of Mines (BOM) at Tulsa (American Airlines). The exercise was not intended to be a correlation of laboratories but an attempt to uncover major differences in analysis among laboratories which might be caused by the use of poor quality calibration gases or poor sampling techniques. The results that have been obtained raise questions concerning carbon monoxide analyses but the overall effort has been worthwhile in building confidence in comparability among the above-named laboratories engaged in the emissions measurement program.

Table A-1 is a summary of the data collected. Detailed information was accumulated also concerning the physical specifications of each instrument used so that an estimate could be made of instrumental sensitivity and expected accuracy. The sample cell length and calibration range were found to vary considerably from one instrument to another. Based on this type of information, an optimistic accuracy band was estimated for each instrument and is given as a parenthetical value adjacent to each data point in Table A-1. The largest variation in expected accuracy is seen to occur among the CO instruments. Variation in concentration measurements was also the largest for CO but this fact is not considered entirely attributable to instrument variation.

Sampling systems were checked for leaks by plugging the sample line and observing the flow drop-off. All systems appeared to be tight.

A cylinder of hydrocarbon-free air was used to check the hydrocarbon level in the zero gas being used by these laboratories. The zero gas at SWRI was found to contain less than 0.6 ppm propane and the BOM span gas contained 1.6 ppm propane. The EPA span gas at Phoenix contained zero hydrocarbon relative to the reference cylinder.

At those laboratories using chemiluminescence instrumentation for oxides of nitrogen measurement, a determination of the NO_2-NO converter efficiency was made. EPA and SWRI converters approached 100% efficiency. This particular test is made by introducing oxygen into a bag of NO in N_2 span gas and observing the oxidation of NO to NO_2. If the NO_x line remains constant during the oxidation process, the indication is that the thermal converter is working properly.

A similar series of cross checks was then conducted at those emissions measuring laboratories in the Eastern half of the country. These test sites included the following: Detroit Diesel Allison Division (Indianapolis, Indiana), Teledyne Continental Motors (Muskegan, Michigan), Pratt & Whitney Aircraft (East Hartford, Connecticut), Scott Research Laboratories (temporary lab at Allentown Pennsylvania Airport) and Scott Research Laboratories (temporary lab at Naval Air Station, Norfolk, Virginia). Addition cylinders of high-concentration gases were employed at those labs involved in light-utility piston engine studies (Teledyne Continental and Scott Allentown). These additional results are given in Table A-2 which is similar in format to Table A-1.

[NOTE: The material in Appendix A has been abstracted by CAL from two internal memoranda of the Office of Air Programs, Tests & Evaluation Branch, Ypsilanti (to R.C. Stahman from M.W. Korth). This inclusion is at the behest of the EPA.]

Table A-1

SPAN GAS CROSS CHECK

(WESTERN LABORATORIES)

CYLINDER NO.	EPA			SWRI (KELLY AFB)	BOM (AMERICAN)
	(MAIN TERM.)	(BLDG. 2042)	(T&EB PHOENIX)		
A247 HYDROCARBON (ppm, PROPANE)	70.0 (± 1)	72.2 (± 1)	70 (± 1)	67.5 (± 1.5)	69 (± 1)
13359-B HYDROCARBON (ppm, PROPANE)	10.8 (± 1)	10.5 (± 1)	10.6 (± 1)	8.4 (± 1)	9.2 (± 0.5)
A6775 CO, ppm	84 (± 25)	82 (± 25)	120 (± 10)	94 (± 2)	95 (± 1)
A672 CO, ppm CO_2, %	500 (± 25) ------	494 (± 25) 1.57 (± .05)	560 (± .05) 1.61 (± .05)	------ 1.53 (± .05)	530 (± 10) 1.54 (± .05)
A6741 CO_2, %	-----	4.2 (± .05)	4.12 (± .05)	4.05 (± .05)	4.22 (± .05)
A2334 NO, ppm	87 (± 1)	82.2 (± 1)	92.5 (± 1)	82 (± 1)	87 (± 1)
SSB-162 NO, ppm	20.0 (± 1)	21.0 (± 1)	21.0 (± 1)	19 (± 1)	18 (± 1)

Table A-2

SPAN GAS CROSS CHECK (EASTERN LABORATORIES)

CYLINDER NO.	EPA	ALLISON	CONTI-NENTAL	P&W	SCOTT NORFOLK	SCOTT ALLENTOWN
A-247 HYDROCARBON (ppm, PROPANE)	71 (± 1)	60 (± 1)	-----	57.3 (± 2)	68.1 (± 1)	-----
13359-B HYDROCARBON (ppm, PROPANE)	10.7 (± .5)	7.5 (± .5)	-----	9.0 (± .5)	9.7 (± .5)	-----
A6775 CO (ppm)	83. (± 20)	101 (± 2)	-----	93 (± 5)	101 (± 5)	-----
A672 CO (ppm) CO_2 (%)	500 (± 25) 1.57 ± .05)	565 (± ?) 1.68 (± ?)	----- -----	515 (± 20) 1.55 (± .03)	530 (± 20) 1.57 (± .03)	----- -----
A-6741 CO_2 (%)	4.2 (± .05)	4.5 (± .05)	-----	4.16 (± .05)	4.28 (± .03)	-----
A-2334 NO (ppm)	85 (± 1)**	87 (± 3)* 89.5 (± 2)**	----- -----	78 (± 3)*	81.6 (± 2)** 67.5 (± 5)*	----- -----
SSB-162 NO (ppm)	20.5 (± 1)**	21 (± 3)* 20 (± 2)**	----- -----	19.5 (± 3)*	19 (± 2)** 13 (± 3)*	----- -----
I-15738 NO (ppm)	1240 (± 50)**	-----	1140 (± 100)*	-----	-----	1250 (± 50)**
A-1905 CO (%)	1.56 (± .03)	-----	1.5 (± .03)	-----	-----	1.5 (± .2)
1-4523 HYDROCARBON (ppm, PROPANE)	1110 (± 20)	-----	1060 (± 20)	-----	-----	1024 (± 20)
FF-17054 CO (%) CO_2 HC (ppm, PROPANE)	3.99 (± .15) 7.64 (± .2) 731 (± 30)	----- ----- -----	3.95 (± .05) ----- 700 (± 30)	----- ----- -----	----- ----- -----	4.2 (± .2) 7.7 (± .2) 695 (± 30)

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**CHEMILUMINESCENT

Part 2
SUMMARY OF DATA

2.1 DATA TREATMENT AND COMMENTARY

Data for light-utility piston engines and auxiliary power units are presented in the first three tables following this discussion. Table I contains data on piston engines tested by Scott Research Laboratories and Table II contains similar data obtained from Teledyne Continental Motors. Table III is a compilation of data on auxiliary power units (APU); these data were provided by AiResearch.

2.1.1 Piston Engines

Tests on piston engines were conducted by Scott Research Laboratories on engines installed in aircraft. Accordingly, these engines span a broader spectrum of engine age and condition than do the "brand new" engines tested by Teledyne Continental. Differences in the methods of testing and data reduction employed by Scott and by Teledyne Continental, however, necessitated different approaches to mass emissions analysis and precluded incorporating the two sets of data into a single compilation. In view of this fact, care should be taken in comparing results from the two sources, particularly if the intent is to establish emission response to factors such as engine age. Observed differences in emissions may be artifacts of the differences in testing procedures rather than being attributable to independent causes.

2.1.1.1 Scott Research Laboratories

Piston engines tested by Scott Research Laboratories are included in Table I. For the most part, these engines were subjected to a 10-mode test cycle, but in a few instances certain of the modes are missing. From among the ten modes used by Scott, five were selected as being equivalent to those designated by EPA in their LTO cycle. These five modes were then employed in the LTO cycle calculations. Since no horsepower measurements were provided by Scott, it was not possible to reduce the emissions to the basis of pounds pollutant per thousand horsepower hours.

All concentration data provided by Scott Research Laboratories were expressed on a dry basis. To convert these data to emission mass form, therefore, it was necessary to introduce a correction to convert concentrations from dry to wet basis. Correction was made only for the water of combustion, it being assumed that water vapor in the intake air was negligible. The correction factor used was the one proposed by the SAE E-31 Committee*:

$$K = \frac{100}{100 + \alpha/2\,(CO + CO_2)}$$

where CO and CO_2 concentrations are expressed as percent by volume, and α is the atomic hydrogen/carbon ratio of the fuel. Then,

$$\text{Concentration (Wet basis)} = K \cdot \text{Concentration (dry basis)}$$

and the corrected concentrations were converted to pounds pollutant per pound of fuel by the formulas proposed by the E-31 Committee and presented in Part 1 of this report.

It should be noted that, for many of the engines tested by Scott, triplicate runs were made. In the statistical summary for an engine model, these replicate runs were not distinguished from runs on separate engines; consequently, the standard deviations computed for the emission quantities are expected to be somewhat underestimated relative to what might have been observed if there had been no replication of engines. In the triplicate runs on 0-200 engines, the first two runs were done on one exhaust and the third run was done on the other.**

In the statistical summaries it will be noted that the number of engines included in each model summary is sometimes less than the number of engines actually processed as individuals. The difference resides in the fact that for several of the engines the data was incomplete in some sense. For example, if data for one of the pollutants or for one of the modes was missing for a particular engine, that engine was excluded from the statistical summary so as not to bias the mean value or standard deviation.

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*R.W. Hurn et al., "Procedure for the Continuous Sampling and Measurement of Gaseous Emissions From Aircraft Turbine Engines," Final Draft SAE E-31 Committee Paper (May 25, 1971).

**Letter dated July 22, 1971 from Mr. A.F. Souza, Scott Research Laboratories to Mr. Charles Gray, Jr., Environmental Protection Agency.

2.1.1.2 Teledyne Continental Motors

Table II summarizes twenty-one engines belonging to model categories 0-200-A, 0-470-R or IO-520-P. For the most part, these engines were subjected to a 13-mode test cycle, including Idle-Taxi, Take-Off, Climb, and Pattern. Two forms of the Idle-Taxi mode were employed, Idle-Taxi-Low and Idle-Taxi-High. Similarly, two versions of the Climb mode, Rich and Lean, were used, but in some of the tests only one of these modes was run. Some convention was necessary, therefore, in order to comply with the 5-mode LTO cycle designated by EPA. In all cases, Idle-Taxi-High was used as the EPA-designated Idle-Taxi mode, and the mode designated Pattern by Teledyne Continental was renamed Approach, to comply with the EPA designation. In the case of the Climb mode, the LTO cycle computations were made with both Climb-Rich and Climb-Lean data. In all cases where both modes were run, two LTO cycle computations are included; otherwise, the LTO cycle computation is made with whichever of the two Climb modes is available.

A distinguishing feature of the Teledyne Continental tests is that CO_2 was not measured. Consequently, the normally used formulas for converting concentrations to mass emissions are not applicable, and an alternative conversion had to be invoked. The method employed in Table II is the one used by Teledyne Continental and was kindly provided by them.

First, it should be noted that all effluents except Total Hydrocarbons are expressed in the raw data on a dry basis. Except for hydrocarbons, therefore, the following dry-to-wet correction factor was employed:

$$\text{Correction Factor, } K = 1 - \alpha \, ({}^{F}/_{A})$$

where α = Hydrogen/carbon atom ratio

F = Fuel flow, lb/hr

and A = Air flow, lb/hr

This expression for the correction factor is an approximation that is accurate when the specific humidity of the inlet air is low. The complete equation is given in SAE procedure J177. Conversion of CO and NO concentrations to the corresponding mass flow rates was then accomplished by means of the following formula:

$$\text{Pollutant Mass Flow Rate} \quad (\text{lb/hr}) = \frac{M}{M_{EX}} \cdot \frac{conc\,(PPM)}{10^6} \cdot (F+A) \cdot K$$

where M = molecular weight of pollutant

and M_{EX} = molecular weight of exhaust

For conversion of total hydrocarbon concentrations to mass flow rate, the formula is:

$$\text{Pollutant Mass Flow Rate} \quad (\text{lb/hr}) = \frac{M}{M_{EX}} \cdot \frac{conc(PPM)}{10^6} \cdot (F+A)$$

The exhaust molecular weight, M_{EX} , varies as a function of air/fuel ratio. This relationship can be approximated as a straight line, and was represented in the computer calculation by the equation

$$M_{EX} = 21.236 + 0.515\ A/F$$

According to Teledyne Continental, this expression is valid for air/fuel ratios less than stoichiometric, but M_{EX} assumes the constant value 28.96 for air/fuel ratios greater than stoichiometric.*

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*Justification for these relationships can be found in C.F. Taylor and E.S. Taylor, The Internal Combustion Engine, Second Edition, International Textbook Company, Scranton, Pa. (1969) pp. 37-39.

Certain conventions must also be followed with regard to molecular weights. To maintain consistency with other data in this report, some modification of the Teledyne Continental input parameters was made. For example, elsewhere in this report it has been customary to express Total Hydrocarbons as methane, molecular weight 16.04. This value departs somewhat from the value of 14.67 used by Teledyne Continental on the basis of formulas employed by the State of California for heavy duty gasoline engine tests. Also, in the interest of consistency, the hydrogen-carbon ratio was taken as 1.84 rather than the 2.12 used by Teledyne Continental on the assumption of a representative gasoline with formula C_8H_{17}. NO was computed as NO_2 equivalent, using the molecular weight 46.01.

Separate statistical summaries were made for the Climb-Rich and Climb-Lean categories. It will be noted that the number of engines included in each model summary is often less than the number of engines actually processed as individuals. As previously noted, the difference resides in the fact that for several of the engines the data was incomplete in some sense. For example, if data for one of the pollutants or for one of the modes was missing for a particular engine, that engine was excluded from the statistical summary so as not to bias the mean value or standard deviation.

2.1.2 Auxiliary Power Units -- AiResearch

Table III is a compendium of emissions tests made by AiResearch on auxiliary power units. Concentrations in this table are on a wet basis -- that is, the emission concentrations are corrected to concentration in wet exhaust from combustion with dry air.

Mass of pollutant per 1000 pounds of fuel was computed by AiResearch and submitted as part of their report; consequently, it was not necessary to convert pollutant concentrations to mass emission form. Though AiResearch also provided figures for mass of pollutant per hour, it was found more expeditious to compute the mass flow by multiplying pounds pollutant per 1000 pounds of fuel by the corrected fuel flow rate. Note that NO and NO_2 concentrations were reported separately by AiResearch. These separately measured quantities, as well as the combined concentration of total oxides of nitrogen (NO_x), are reproduced in Table III, but mass emission rates are included only for NO_x. The total nitrogen oxides are computed as NO_2, molecular weight 46.01.

In addition to the computations performed by AiResearch and incorporated in Table III, additional computations were performed to express emissions on the basis of pounds pollutant per horsepower hour. For this purpose, it was considered advisable to take into account, wherever possible, both shaft horsepower and the horsepower induced by bleed air loading. In this way, emissions can be charged against the combined equivalent horsepower rather than against the less realistic value of shaft horsepower, which is often small or negligible.

The basis for computing total horsepower as the sum of shaft horsepower and air horsepower was provided by Mr. Charles Dawson of the Environmental Protection Agency, Ann Arbor.

The ideal compression power was taken as isentropic, and the applicable formula for air horsepower is based on the assumption of perfect gas laws and the belief that constant specific heats can be assumed with sufficient accuracy. Typical pressure ratios are about 3 (temperature ratio ≈ 1.36) and inlet compressor temperatures are near normal ambients. For steady flow,

$$\text{Air HP} = 1.415\, W \bar{c}_p T_1 \left[\left(P_2/P_1 \right)^{\frac{K-1}{K}} - 1 \right]$$

where W = corrected bleed flow, lbs/sec
T_1 = compressor inlet temperature, °F
P_2 = compressor discharge pressure, psia
P_1 = compressor inlet pressure, psia

Mean compression temperatures are taken as 190°F (650° Rankine) and K = 1.398. The formula thus reduces to

$$\text{Air HP} = (1.415)\cdot W\cdot(0.241)\left[\left(\frac{P_2}{14.7}\right)^{0.285}-1\right]$$

$$= 0.341\,W\left[\left(\frac{P_2}{14.7}\right)^{0.285}-1\right]$$

In reducing the AiResearch data to horsepower basis, the air horsepower as computed from the above formula was added to the corrected shaft horsepower. This combined quantity was used as divisor in reducing pounds of pollutant per hour to pounds of pollutant per horsepower hour.

2.1.3 Turbine/Turboprop Engines

Data for turbine and turboprop engines are presented in Tables IV and V. Table IV contains baseline data, in which a normal LTO cycle and conventional ground-operation tactics are employed. The basis of the LTO cycle, as prescribed by EPA, is discussed in Part 1 of this report. Basically, the cycle consists of taxi/idle prior to takeoff, takeoff, climbout, approach and taxi/idle subsequent to landing. To each of these modes a time in mode is assigned in accordance with airport experience.

Table IV presents, for the most part, two pages of information for each engine. On the first page is tabulated the identification of the engine, the engine supplier, the test organization, such essential engine data as thrust or power rating and engine-overhaul history, and prevailing ambient test conditions. This information is followed by a tabulation of test data, including pollutant concentrations and a description of the test modes in terms of engine operating conditions.

At this juncture it should be pointed out that verbal names assigned to the various test modes varied considerably from one test organization to another. In view of this fact and the fact that subsequent designation of modes is mandated by the EPA-prescribed LTO cycle, test modes are tabulated only in numerical terms. Each test mode is tabulated as a pair of integers separated by a slash. The number preceding the slash denotes the mode under test, whereas the number following the slash denotes the mode previously tested. Thus the entry "3/5" denotes that the data in that line of the table is for the third mode and that the mode which preceded it is in the test sequence was mode 5. Similarly, "3/2" denotes that the third mode was preceded in the test sequence by mode 2. The modes are numbered in ascending order of power or thrust settings; accordingly, the slash notation makes evident whether a particular mode was tested as part of an ascending or descending sequence of power or thrust settings. The sequence of testing is further elucidated by the column labeled either "Clock-Time" or "Elapsed Time." Clock time, such as 2037, denotes "2037 hours", or 8:37 p.m. Elapsed time is in minutes and is measured from a zero time reference at the beginning of the test sequence. If the time entry is -0.00, no time-of-test information was available.

For each test mode, the actual thrust or shaft horsepower is tabulated; this number is followed by "Percent Rated T.O." obtained by dividing the test-mode setting by the rated thrust or horsepower. The resulting values are expressed as integer percentages and are truncated, rather than rounded, quantities. Thus, for example, 5% brackets a range from 5.00% to 5.99%. This fact should be borne in mind in comparing the mass emissions computed from raw data with mass emissions values interpolated for the LTO-cycle calculations.

Mass emissions for each test mode were computed according to the conversion formulas of Section 1.2, Methodology of Data Analysis, and are expressed as pounds of pollutant per thousand pounds of fuel and as pounds of pollutant per hour. Pounds of pollutant per hour is the product of fuel consumption rate, in pounds per hour, and pounds of pollutant per pound of fuel. Finally, the pollutant mass is expressed on the basis of mass of pollutant per unit of energy. For turboprops, this unit is taken as 1000 horsepower hours; for turbines, the corresponding unit is 1000 pounds thrust hours, since horsepower rating is not applicable in this instance.

The converted quantities expressed as pounds of pollutant per pound of fuel were plotted against percent power or thrust and processed as described in Section 1.2 to obtain interpolated values at specified settings for idle/taxi, takeoff, climbout and approach, as specified by EPA. These interpolated values then formed the basis for the calculations tabulated as the second page of information for each engine. If for some reason, such as incomplete data, it is impossible to complete the LTO-cycle calculation, then the second page of information is omitted.

Pollutant mass for a particular mode is computed by multiplying pounds of pollutant per hour by time in mode. Similarly, energy for that mode is found by multiplying thrust or power by time in mode. Division of pollutant mass by energy for each mode gives the corresponding pounds of pollutant per horsepower hour or per pound thrust hour. In a similar manner, pounds of pollutant per pound of fuel for the entire cycle is obtained by dividing the total pollutant mass for the cycle by the total fuel mass for the cycle. The result is a quantity which can be interpreted as the average rate at which pollutant is generated per pound of fuel, the average reflecting appropriately the times spent in the various modes. The pounds of pollutant per 1000 horsepower hours or per 1000 pounds thrust hours is similarly computed by dividing the total pollutant mass for the cycle by the total energy for the cycle.

It will be noted that in some instances the emission rate or mass is recorded as 0.0. This type of entry may occur, for example, when it is necessary to obtain CO or HC values at 100 percent thrust by extrapolation of the corresponding plots of pollutant mass emission versus power or thrust. If the extrapolation yields a negative value, the extrapolated value is defined to be zero. Such a result is completely consistent with facts, because it will not occur unless the pollutant mass is indeed negligible at high power or thrust settings.

Statistical summaries following the results for individual engines are computed in two ways, the two summaries being differentiated by changes in "useage weighting factors." The summary appearing in Table IV applies to the data for individual engines as displayed in that table and is based on useage weighting factors of unity for all modes. In Table V, the useage weighting factors are 1.00 for takeoff, approach and climb modes but are reduced to either 0.50 or 0.67 for the two taxi/idle modes. The reduced values are based on a modification of ground-operation tactics in which, for two-engine or four-engine aircraft, only half of the engines are in operation and for three-engine aircraft only two-thirds of the engines are in operation. The thrust or power settings for the engines remaining in operation are increased proportionately to compensate for the engines not in operation. Comparison of the two statistical summaries will reveal that substantial reductions in CO and HC emissions may occur as a result of this change, primarily because of the steep negative slope of the CO and HC curves at low power or thrust settings.

2.2 TABULATED RESULTS

TABLE I

LIGHT-UTILITY PISTON ENGINES

SCOTT RESEARCH LABORATORIES

CONTENTS:

I-2 TO I-107	INDIVIDUAL ENGINE RUNS – COMPLETELY PROCESSED
I-108 TO I-110	MODEL SUMMARIES
I-111 TO I-116	INDIVIDUAL ENGINE RUNS – MASS EMISSION CONVERSIONS ONLY
I-117 TO I-123	INDIVIDUAL ENGINE RUNS – INPUT DATA REPRODUCED ONLY

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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:  166    ENGINE TYPE AND MODEL:  O-200-A                    SERIAL NUMBER:   204598-9-AA

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:    284. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA **********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   77.50   FINISH   79.00

     ATMOSPHERIC PRESSURE:              START   30.01   FINISH   30.01

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     64.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00   FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:




                 CARB.    TEST     ENGINE      MEASURED      MEASURED      CALCULATED
                HEATER    MODE      RPM        FUEL FLOW     AIR FLOW         F/A
                                                 LB/HR         LB/HR

IDLE-LOW                    1       -0.0          5.60         62.00        0.03861
IDLE/TAXI                   2       -0.0         11.50        119.00        0.04045
RUN UP                      3       -0.0         17.60        202.00        0.04237
RUN UP-LEAN                 4       -0.0         18.40        204.00        0.04413
RUN UP-RICH                 5       -0.0         16.70        195.00        0.04125
TAKE-OFF                    6       -0.0         49.60        540.00        0.05349
CLIMB                       7       -0.0         49.60        540.00        0.05349
DESCENT                     8       -0.0         32.80        398.00        0.04461
DESCENT           ON        8       -0.0         39.20        387.00        0.05093
APPROACH                    9       -0.0         22.00        247.00        0.04322
TAXI                       10       -0.0          8.90         98.00        0.03790


 TEST   EXHAUST    EXHAUST      CO        CO        THC       NO        NO        NO     ALDEHYDES    SMOKE     PARTICULATES
 MODE     GAS        GAS       (DRY)       2       (DRY)     (DRY)       2         X      (DRY)
         TEMP     PRESSURE  PERCENT V   (DRY)      PPMV      PPMV     (DRY)     (DRY)
       DEGREES F    PSIA              PERCENT V                        PPMV      PPMV

   1    336.00     -0.00       3.70      4.00    5003.00     16.00    -0.00     -0.00     18.00      -0.00        -0.00
   2    460.00     -0.00       4.80      3.30    4616.00     20.00    -0.00     -0.00     13.00      -0.00        -0.00
   3    807.00     -0.00       4.40      4.40    2128.00    140.00    -0.00     -0.00     -0.00      -0.00        -0.00
   4    796.00     -0.00       5.00      4.10    2736.00     93.00    -0.00     -0.00     -0.00      -0.00        -0.00
   5    807.00     -0.00       4.10      4.50    1797.00     95.00    -0.00     -0.00     -0.00      -0.00        -0.00
   6   1110.00     -0.00       6.50      4.70    1852.00    198.00    -0.00     -0.00      6.00      -0.00        -0.00
   7   1110.00     -0.00       6.50      4.70    1852.00    198.00    -0.00     -0.00      5.00      -0.00        -0.00
   8   1076.00     -0.00       4.10      5.30    1299.00    322.00    -0.00     -0.00      5.00      -0.00        -0.00
   8    975.00     -0.00       7.10      3.40    2736.00     57.00    -0.00     -0.00      6.00      -0.00        -0.00
   9    874.00     -0.00       4.80      4.20    1852.00    155.00    -0.00     -0.00      6.00      -0.00        -0.00
  10    493.00     -0.00       4.30      3.50    2294.00     37.00    -0.00     -0.00      6.00      -0.00        -0.00


 TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1     911.54     70.59      0.0     1548.36     0.65      0.65   5104.60    395.31      0.0    8670.79      3.63      3.63
   2    1132.63     62.38      0.0     1223.49     0.78      0.78  13025.24    717.39      0.0   14070.09      8.91      8.91
   3     986.27     27.32      0.0     1549.65     5.15      5.15  17358.29    480.81      0.0   27273.79     90.72     90.72
   4    1077.62     33.77      0.0     1388.41     3.29      3.29  19828.18    521.40      0.0   25546.71     60.58     60.58
   5     943.42     23.68      0.0     1626.95     3.59      3.59  15755.14    395.49      0.0   27169.98     59.96     59.96
   6    1153.39     18.82      0.0     1310.38     5.77      5.77  57207.91    933.53      0.0   64994.84    286.24    286.24
   7    1153.39     18.82      0.0     1310.38     5.77      5.77  57207.91    933.53      0.0   64994.84    286.24    286.24
   8     869.16     15.77      0.0     1765.34    11.21     11.21  28508.27    517.30      0.0   57903.03    367.76    367.76
   8    1331.37     29.38      0.0     1001.75     1.76      1.76  52189.76   1151.83      0.0   39268.48     68.82     68.82
   9    1055.7.     23.13      0.0     1451.45     5.60      5.60  23226.13    513.24      0.0   31931.80    123.19    123.19
  10    1081.90     33.36      0.0     1383.65     1.53      1.53   9628.91    294.20      0.0   12314.45     13.61     13.61


                                                  LTO CYCLE EMISSIONS

 TEST    TIME IN   MEASURED    FUEL       CO        CO        CO         HC        HC        HC         NO        NO        NO
 MODE     MODE    FUEL FLOW    USED     LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION
          MIN.      LB/HR      LBS.    LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.

   2     12.00     11.50       2.30    1132.63  13025.24    2.605      62.38    717.39     0.143      0.78       8.91    0.0018
   6      0.30     49.60       0.25    1153.39  57207.91    0.286      18.82    933.53     0.005      5.77     286.24    0.0014
   7      5.00     49.60       4.12    1153.39  57207.91    4.748      18.82    933.53     0.077      5.77     286.24    0.0238
   9      6.00     22.00       2.20    1055.73  23226.13    2.323      23.33    513.24     0.051      5.60     123.19    0.0123
  10      4.00      8.90       0.60    1081.90   9628.91    0.645      33.06    294.20     0.020      1.53      13.61    0.0009

 TOTAL FOR CYCLE                9.461                      10.607                          0.297                          0.0402

 TOTAL FOR CYCLE/LB FUEL                                    1.121                          0.031                          0.0042
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:  167    ENGINE TYPE AND MODEL:  O-200-A                   SERIAL NUMBER:   204598-9-A8

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:    284. HRS

     FUEL: AV GAS 80/87             FUEL H/C RATIO:    1.840

OPERATIONAL DATA **********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   80.50   FINISH   82.00

     ATMOSPHERIC PRESSURE:              START   30.00   FINISH   30.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     56.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:



                       CARB.    TEST     ENGINE      MEASURED      MEASURED      CALCULATED
                       HEATER   MODE      RPM        FUEL FLOW     AIR FLOW         F/A
                                                      LB/HR         LB/HR

IDLE-LOW                         1        -0.0         6.40         81.00         0.04323
IDLE/TAXI                        2        -0.0         9.80        108.00         0.04764
RUN UP                           3        -0.0        19.30        232.00         0.04807
RUN UP-LEAN                      4        -0.0        16.70        201.00         0.04541
RUN UP-RICH                      5        -0.0        16.70        199.00         0.04852
TAKE-OFF                         6        -0.0        51.50        564.00         0.05615
CLIMB                            7        -0.0        51.50        564.00         0.05615
DESCENT                          8        -0.0        35.50        435.00         0.04973
DESCENT                 ON       8        -0.0        38.30        382.00         0.05666
APPROACH                         9        -0.0        22.00        249.00         0.05008
TAXI                            10        -0.0         8.10         89.00         0.05085


  TEST   EXHAUST     EXHAUST       CO         CO         THC        NO         NO         NO      ALDEHYDES    SMOKE     PARTICULATES
  MODE    GAS         GAS         (DRY)        2        (DRY)      (DRY)        2          X        (DRY)
          TEMP      PRESSURE    PERCENT V    (DRY)       PPMV       PPMV      (DRY)      (DRY)
        DEGREES F     PSIA                PERCENT V                           PPMV       PPMV

    1    247.00      -0.00        3.30       5.80     1596.00      63.00      -0.00      -0.00      14.00      -0.00       -0.00
    2    370.00      -0.00        5.70       4.30     1241.00      40.00      -0.00      -0.00      12.00      -0.00       -0.00
    3    639.00      -0.00        4.70       5.50      768.00     227.00      -0.00      -0.00      -0.00      -0.00       -0.00
    4    560.00      -0.00        4.40       5.20      946.00     144.00      -0.00      -0.00      -0.00      -0.00       -0.00
    5    695.00      -0.00        4.80       5.50      709.00     159.00      -0.00      -0.00      -0.00      -0.00       -0.00
    6   1099.00      -0.00        7.00       4.90      591.00     174.00      -0.00      -0.00      -0.00      -0.00       -0.00
    7   1099.00      -0.00        7.00       4.90      591.00     174.00      -0.00      -0.00       8.00      -0.00       -0.00
    8   1087.00      -0.00        4.60       6.00      552.00     338.00      -0.00      -0.00       9.00      -0.00       -0.00
    8    975.00      -0.00        3.10       3.80     1025.00      50.00      -0.00      -0.00       3.00      -0.00       -0.00
    9    874.00      -0.00        5.70       4.90      729.00     179.00      -0.00      -0.00       6.00      -0.00       -0.00
   10    471.00      -0.00        6.20       4.50     1143.00      53.00      -0.00      -0.00       9.00      -0.00       -0.00


  TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE       CO         HC         NO2        CO2        NO         NOX        CO,        HC         NO2        CO2        NO         NOX
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    1      719.99      19.94       0.0     1988.27       2.26       2.26    4607.90     127.63       0.0    12724.94      14.45      14.45
    2     1137.42      14.18       0.0     1348.19       1.31       1.31   11146.70     138.99       0.0    13212.29      12.85      12.85
    3      923.94       8.65       0.0     1698.81       7.33       7.33   17831.94     166.88       0.0    32787.02     141.46     141.46
    4      916.91      11.29       0.0     1702.60       4.93       4.93   15312.31     188.55       0.0    28433.48      82.31      82.31
    5      935.03       7.91       0.0     1683.40       5.09       5.09   15615.03     132.10       0.0    28112.71      84.96      84.96
    6     1182.50       5.72       0.0     1300.58       4.83       4.83   60898.79     294.47       0.0    66979.94     248.65     248.65
    7     1182.50       5.72       0.0     1300.58       4.83       4.83   60898.79     294.47       0.0    66979.94     248.65     248.65
    8      872.16       5.99       0.0     1787.43      10.53      10.53   30961.79     212.79       0.0    63453.49     373.68     373.68
    8     1363.37       9.88       0.0     1004.97       1.38       1.38   52217.22     378.44       0.0    38490.22      52.94      52.94
    9     1078.93       7.90       0.0     1457.32       5.57       5.57   23736.51     173.87       0.0    32060.96     122.44     122.44
   10     1158.23      12.23       0.0     1320.85       1.63       1.63    9381.67      99.06       0.0    10698.93      13.17      13.17


                                                     LTO CYCLE EMISSIONS

  TEST    TIME IN    MEASURED     FUEL        CO          CO          CO          HC         HC          HC         NO          NO          NO
  MODE     MODE     FUEL FLOW     USED       LB/1K       LB/1K     EMISSION     LB/1K      LB/1K     EMISSION     LB/1K       LB/1K     EMISSION
           MIN.       LB/HR       LBS.      LB FUEL      HOURS       LBS.      LB FUEL     HOURS       LBS.      LB FUEL      HOURS       LBS.

    2      12.00       9.80       1.96      1137.42    11146.70      2.229       14.18     138.99      0.028       1.31       12.85     0.0026
    6       0.30      51.50       0.26      1182.50    60898.79      0.304        5.72     294.47      0.001       4.83      248.65     0.0012
    7       5.00      51.50       4.27      1182.50    60898.79      5.055        5.72     294.47      0.024       4.83      248.65     0.0206
    9       6.00      22.00       2.20      1078.93    23736.51      2.374        7.90     173.87      0.017       5.57      122.44     0.0122
   10       4.00       8.10       0.54      1158.23     9381.67      0.629       12.23      99.06      0.007       1.63       13.17     0.0009

TOTAL FOR CYCLE                   9.235                             10.591                             0.078                             0.0376

TOTAL FOR CYCLE/LB FUEL                                              1.147                             0.008                             0.0041
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ***************************************************************************************************
                                                                              SERIAL NUMBER:   204598-9-AC
     CAL ID NUMBER:  168    ENGINE TYPE AND MODEL:  O-200-A

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:    284. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:   1.840
***************************************************************************************************
OPERATIONAL DATA ************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   82.00   FINISH   81.00

     ATMOSPHERIC PRESSURE:              START   30.02   FINISH   30.02

     INLET AIR HUMIDITY, GRN H2O/LB AIR:      0.01

     RELATIVE HUMIDITY:                      51.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.0C,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  11

 COMMENTS:


                     CARB.     TEST      ENGINE      MEASURED      MEASURED      CALCULATED
                     HEATER    MODE       RPM        FUEL FLOW     AIR FLOW         F/A
                                                      LB/HR         LB/HR

 IDLE-LOW                        1        -0.0          3.90          47.00        0.03758
 IDLE/TAXI                       2        -0.0          8.90          98.00        0.04163
 RUN UP                          3        -0.0         16.7C         198.00        0.04540
 RUN UP-LEAN                     4        -0.0         16.70         199.00        0.04448
 RUN UP-RICH                     5        -0.0         16.7C         201.00        0.04487
 TAKE-OFF                        6        -0.0         50.60         570.00        0.05055
 CLIMB                           7        -0.0         50.60         570.00        0.05055
 DESCENT                         8        -0.0         35.50         434.00        0.04653
 DESCENT                         8        -0.0         44.80         453.00        0.05293
 APPROACH                        9        -0.0         22.00         247.00        0.04735
 TAXI                           10        -0.0          8.10          89.00        0.04622


  TEST   EXHAUST    EXHAUST      CO         CO        THC        NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS        GAS       (DRY)        2       (DRY)     (DRY)       2         X      (DRY)
          TEMP     PRESSURE   PERCENT V    (DRY)     PPMV      PPMV     (DRY)     (DRY)
        DEGREES F    PSIA               PERCENT V                        PPMV      PPMV

   1     291.00     -0.00       3.20       4.60    2060.00     30.00    -0.00     -0.00    13.00      -0.00       -0.00
   2     437.00     -0.00       5.00       3.70    1260.00     37.00    -0.00     -0.00    12.00      -0.00       -0.00
   3     762.00     -0.00       4.60       5.00     845.00    290.00    -0.00     -0.00    -0.00      -0.00       -0.00
   4     695.00     -0.00       4.40       5.00     881.00    132.00    -0.00     -0.00    -0.00      -0.00       -0.00
   5     796.00     -0.00       4.30       5.20     810.00    174.00    -0.00     -0.00    -0.00      -0.00       -0.00
   6    1256.00     -0.00       5.90       4.80     669.00    181.00    -0.00     -0.00    -0.00      -0.00       -0.00
   7    1256.00     -0.00       5.90       4.80     669.00    181.00    -0.00     -0.00     7.00      -0.00       -0.00
   8    1233.00     -0.00       4.30       5.60     528.00    311.00    -0.00     -0.00     5.00      -0.00       -0.00
   8    1099.00     -0.00       7.40       3.70    1109.00     76.00    -0.00     -0.00     7.00      -0.00       -0.00
   9     998.00     -0.00       5.50       4.50     740.00    142.00    -0.00     -0.00     7.00      -0.00       -0.00
  10     583.00     -0.00       5.70       4.00    1109.00     44.00    -0.00     -0.00    10.00      -0.00       -0.00


  TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K     LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1     807.49      29.77       0.0     1823.82       1.24       1.24     3149.20    116.11       0.0      7112.90      4.85       4.85
   2    1144.38      16.62       0.0     1330.57       1.39       1.39    10184.94    147.93       0.0     11842.09     12.38      12.38
   3     959.58      10.10       0.0     1638.83       6.85       6.85    16025.02    168.59       0.0     27368.39    114.44     114.44
   4     936.86      10.74       0.0     1672.75       4.62       4.62    15645.57    179.42       0.0     27934.92     77.10      77.10
   5     906.69       9.78       0.0     1722.79       6.03       6.03    15141.74    163.36       0.0     28770.60    100.64     100.64
   6    1107.04       7.19       0.0     1415.11       5.58       5.58    56016.20    363.78       0.0     71604.63    282.27     282.27
   7    1107.04       7.19       0.0     1415.11       5.58       5.59    56016.20    363.78       0.0     71604.63    282.27     282.27
   8     872.82       6.14       0.0     1786.01      10.37      10.37    30985.12    217.90       0.0     63403.21    368.10     368.10
   8    1333.50      11.45       0.0     1047.61       2.25       2.25    59740.81    512.76       0.0     46933.11    100.78     100.78
   9    1102.97       8.50       0.0     1417.92       4.68       4.68    24265.27    186.98       0.0     31194.17    102.90     102.90
  10    1173.73      13.08       0.0     1294.17       1.49       1.49     9507.20    105.94       0.0     10482.77     12.05      12.05


                                                   LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL        CO          CO         CO         HC        HC         HC         NO        NO         NO
  MODE     MODE     FUEL FLOW   USED       LB/1K       LB/1K     EMISSION    LB/1K     LB/1K     EMISSION    LB/1K     LB/1K     EMISSION
           MIN.      LB/HR      LBS.      LB FUEL      HOURS      LBS.      LB FUEL    HOURS      LBS.      LB FUEL    HOURS      LBS.

   2      12.00       8.90      1.78     1144.38    10184.94     2.037      16.62     147.93     0.030      1.39      12.38     0.0025
   6       0.30      50.60      0.25     1107.04    56016.20     0.283       7.19     363.78     0.002      5.58     282.27     0.0014
   7       5.00      50.60      4.20     1107.04    56016.20     4.649       7.19     363.78     0.030      5.58     282.27     0.0234
   9       6.00      22.00      2.20     1102.97    24265.27     2.427       8.50     186.98     0.019      4.68     102.90     0.0103
  10       4.00       8.10      0.54     1173.73     9507.20     0.637      13.08     105.94     0.007      1.49      12.05     0.0008
                                                                                                                        0.0384
                                                              10.030                         0.087
 TOTAL FOR CYCLE                8.975
                                                               1.117                                                     0.0043
 TOTAL FOR CYCLE/LB FUEL                                                                     0.010
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DATE:  7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************************

    CAL ID NUMBER:  169    ENGINE TYPE AND MODEL:  O-200-A                 SERIAL NUMBER:   213378-71AA

                           RATED HORSEPOWER:   100.

    ENGINE TOTAL TIME:     43. HRS

    FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START    70.00   FINISH    72.00

    ATMOSPHERIC PRESSURE:              START    30.24   FINISH    30.23

    INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

    RELATIVE HUMIDITY:                     76.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

    SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  11

 COMMENTS:



                      CARB.     TEST      ENGINE       MEASURED       MEASURED       CALCULATED
                      HEATER    MODE       RPM         FUEL FLOW      AIR FLOW          F/A
                                                        LB/HR          LB/HR

 IDLE-LOW                         1        -0.0          5.60          63.00          0.06193
 IDLE/TAXI                        2        -0.0          8.10          94.00          0.05667
 RUN UP                           3        -0.0         12.40         135.00          0.05928
 RUN UP-LEAN                      4        -0.0         13.20         145.00          0.05478
 RUN UP-RICH                      5        -0.0         14.10         163.00          0.06449
 TAKE-OFF                         6        -0.0         49.60         540.00          0.07863
 CLIMB                            7        -0.0         49.60         540.00          0.07863
 DESCENT                          8        -0.0         35.50         428.00          0.06745
 DESCENT               ON         8        -0.0         44.80         481.00          0.07723
 APPROACH                         9        -0.0         22.00         239.00          0.06975
 TAXI                            10        -0.0          5.60          66.00          0.05836


  TEST    EXHAUST     EXHAUST       CO         CO        THC        NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
  MODE      GAS         GAS       (DRY)         2       (DRY)     (DRY)        2           X        (DRY)
           TEMP      PRESSURE   PERCENT V    (DRY)      PPMV      PPMV      (DRY)       (DRY)
         DEGREES F     PSIA               PERCENT V                          PPMV        PPMV

   1      258.00      -0.00        6.10       6.50    6911.00     11.00     -0.00       -0.00      10.00      -0.00       -0.00
   2      314.00      -0.00        5.70       6.10    3415.00     33.00     -0.00       -0.00      20.00      -0.00       -0.00
   3      560.00      -0.00        7.00       5.40    2555.00     92.00     -0.00       -0.00      -0.00      -0.00       -0.00
   4      493.00      -0.00        6.40       5.00    2770.00     64.00     -0.00       -0.00      -0.00      -0.00       -0.00
   5      605.00      -0.00        6.80       6.80    2555.00     70.00     -0.00       -0.00      -0.00      -0.00       -0.00
   6     1121.00      -0.00        9.80       6.90    1802.00    148.00     -0.00       -0.00      -0.00      -0.00       -0.00
   7     1121.00      -0.00        9.80       6.90    1802.00    148.00     -0.00       -0.00       6.00      -0.00       -0.00
   8     1054.00      -0.00        6.50       7.90    1640.00    233.00     -0.00       -0.00      13.00      -0.00       -0.00
   8     1043.00      -0.00        9.80       6.50    2501.00    569.00     -0.00       -0.00       6.00      -0.00       -0.00
   9      819.00      -0.00        8.60       6.10    2286.00     74.00     -0.00       -0.00       4.00      -0.00       -0.00
  10      392.00      -0.00        5.60       6.70    2393.00     47.00     -0.00       -0.00       6.00      -0.00       -0.00


  TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1      927.19      60.16       0.0      1552.36      0.27       0.27     5192.29     336.91       0.0      8643.21      1.54       1.54
   2      948.43      32.54       0.0      1594.77      0.90       0.90     7682.27     263.60       0.0     12917.63      7.31       7.31
   3     1117.43      23.36       0.0      1354.42      2.41       2.41    13856.14     289.65       0.0     16794.84     29.91      29.91
   4     1107.26      27.45       0.0      1359.19      1.82       1.82    14615.86     362.30       0.0     17941.24     24.01      24.01
   5      991.49      21.34       0.0      1557.85      1.68       1.68    13980.02     300.84       0.0     21965.73     23.64      23.64
   6     1172.87      12.35       0.0      1297.51      2.91       2.91    58174.41     612.64       0.0     64356.59    144.31     144.31
   7     1172.87      12.35       0.0      1297.51      2.91       2.91    58174.41     612.64       0.0     64356.58    144.31     144.31
   8      901.64      13.03       0.0      1721.82      5.31       5.31    32008.31     462.53       0.0     61124.42    188.46     188.46
   8     1196.27      17.48       0.0      1246.67     11.41      11.41    53592.65     783.32       0.0     55850.98    511.11     511.11
   9     1163.81      17.72       0.0      1297.03      1.64       1.64    25603.76     389.79       0.0     28534.71     36.19      36.19
  10      902.23      22.08       0.0      1696.06      1.24       1.24     5052.48     123.65       0.0      9497.94      6.97       6.97


                                                      LTO CYCLE EMISSIONS

  TEST    TIME IN    MEASURED     FUEL        CO          CO          CO         HC         HC         HC          NO         NO          NO
  MODE      MODE    FUEL FLOW     USED       LB/1K       LB/1K     EMISSION     LB/1K      LB/1K     EMISSION     LB/1K      LB/1K     EMISSION
            MIN.      LB/HR       LBS.      LB FUEL      HOURS       LBS.      LB FUEL     HOURS       LBS.      LB FUEL     HOURS       LBS.

   2       12.00       8.10       1.62      948.43     7682.27      1.534       32.54     263.60      0.053       0.90        7.31     0.0015
   6        0.30      49.60       0.25     1172.87    58174.41      0.291       12.35     612.64      0.003       2.91      144.31     0.0007
   7        5.00      49.60       4.12     1172.87    58174.41      4.828       12.35     612.64      0.051       2.91      144.31     0.0120
   9        6.00      22.00       2.20     1163.81    25603.76      2.560       17.72     389.79      0.039       1.64       36.19     0.0036
  10        4.00       5.60       0.38      902.23     5052.48      0.339       22.08     123.65      0.008       1.24        6.97     0.0005

                                                                                                                          0.0182
 TOTAL FOR CYCLE                  8.560                             9.555                             0.154

                                                                                                                          0.0021
 TOTAL FOR CYCLE/LB FUEL                                            1.116                             0.018
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINF DATA ****************************************************************************************************************

     CAL ID NUMBER:  170    ENGINE TYPE AND MODEL:  O-200-A                    SERIAL NUMBER:   213378-71AB

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:     43. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    72.00    FINISH    72.00

     ATMOSPHERIC PRESSURE:              START    30.23    FINISH    30.23

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     75.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  11

 COMMENTS:



                    CARB.     TEST      FNGINE      MEASURED       MEASURED       CALCULATED
                    HEATER    MODE       RPM        FUEL FLOW      AIR FLOW          F/A
                                                     LB/HR          LB/HR

 IDLE-LOW                      1         -0.0         3.90          46.00          0.05391
 IDLE/TAXI                     2         -0.0         8.10          97.00          0.05477
 RUN UP                        3         -0.0        15.00         181.00          0.06011
 RUN UP-LEAN                   4         -0.0        13.20         161.00          0.05534
 RUN UP-RICH                   5         -0.0        13.20         159.00          0.06053
 TAKE-OFF                      6         -0.0        49.60         539.00          0.07689
 CLIMB                         7         -0.0        49.60         539.00          0.07689
 DESCENT                       8         -0.0        35.50         425.00          0.06752
 DESCENT             ON        8         -0.0        42.00         451.00          0.07628
 APPROACH                      9         -0.0        20.20         220.00          0.06836
 TAXI                         10         -0.0         6.40          76.00          0.05654


  TEST   EXHAUST    EXHAUST      CO         CO        THC        NO        NC        NO      ALDEHYDES    SMOKE     PARTICULATES
  MODE     GAS        GAS       (DRY)        2       (DRY)      (DRY)       2         X       (DRY)
          TEMP     PRESSURE   PERCENT V   (DRY)      PPMV       PPMV     (DRY)     (DRY)
        DEGREES F    PSIA               PERCENT V                         PPMV      PPMV

   1     179.00     -0.00       4.70       6.40    4699.00     15.00     -0.00     -0.00      18.00      -0.00        -0.00
   2     280.00     -0.00       4.90       6.50    3593.00     50.00     -0.00     -0.00       8.00      -0.00        -0.00
   3     527.00     -0.00       5.50       7.20    2432.00    170.00     -0.00     -0.00      -0.00      -0.00        -0.00
   4     471.00     -0.00       4.80       6.80    2985.00    101.00     -0.00     -0.00      -0.00      -0.00        -0.00
   5     583.00     -0.00       5.70       7.10    2266.00    120.00     -0.00     -0.00      -0.00      -0.00        -0.00
   6    1076.00     -0.00       9.60       6.70    1935.00    181.00     -0.00     -0.00       6.00      -0.00        -0.00
   7    1076.00     -0.00       9.60       6.70    1935.00    181.00     -0.00     -0.00       8.00      -0.00        -0.00
   8    1054.00     -0.00       6.60       7.80    1714.00    255.00     -0.00     -0.00       7.00      -0.00        -0.00
   8    1031.00     -0.00       9.60       6.50    2487.00    627.00     -0.00     -0.00       6.00      -0.00        -0.00
   9      -0.00     -0.00       8.30       6.10    2322.00     94.00     -0.00     -0.00      10.00      -0.00        -0.00
  10      -0.00     -0.00       5.40       6.50    2377.00     54.00     -0.00


  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1     820.67     46.99      0.0     1755.86     0.43      0.43   3200.62    183.27      0.0     6847.96      1.68      1.68
   2     841.81     35.35      0.0     1754.58     1.41      1.41   6818.70    286.36      0.0    14212.06     11.43     11.43
   3     858.47     21.74      0.0     1765.76     4.36      4.36  12876.98    326.11      0.0    26486.33     65.38     65.38
   4     814.99     29.03      0.0     1814.08     2.82      2.82  10757.83    383.15      0.0    23945.86     37.18     37.18
   5     883.99     20.13      0.0     1730.09     3.06      3.06  11668.62    265.67      0.0    22837.11     40.35     40.35
   6    1175.87     13.57      0.0     1289.44     3.64      3.64  58323.27    673.28      0.0    63956.31    180.62    180.62
   7    1175.87     13.57      0.0     1289.44     3.64      3.64  58323.27    673.28      0.0    63956.31    180.62    180.62
   8     915.05     13.61      0.0     1699.16     5.81      5.81  32484.23    483.15      0.0    60320.04    206.15    206.15
   8    1186.29     17.60      0.0     1262.03    12.73     12.73  49824.06    739.25      0.0    53005.34    534.51    534.51
   9    1145.96     18.36      0.0     1323.31     2.13      2.13  23148.42    370.90      0.0    26730.77     43.06     43.06
  10     898.79     22.66      0.0     1699.88     1.48      1.49   5752.27    145.02      0.0    10879.20      9.45      9.45


                                                    LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL       CO         CO         CO        HC        HC         HC        NO        NO        NO
  MODE     MODE     FUEL FLOW   USED      LB/1K      LB/1K    EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K   EMISSION
           MIN.      LB/HR      LBS.     LB FUEL     HOURS      LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS     LBS.

   2      12.00       8.10      1.62     841.81    6818.70     1.364     35.35    286.36     0.057      1.41     11.43    0.0023
   6       0.30      49.60      0.25    1175.87   58323.27     0.292     13.57    673.28     0.003      3.64    180.62    0.0009
   7       5.00      49.60      4.12    1175.87   58323.27     4.841     13.57    673.28     0.056      3.64    180.62    0.0153
   9       6.00      20.20      2.02    1145.96   23148.42     2.315     18.36    370.90     0.037      2.13     43.06    0.0043
  10       4.00       6.40      0.43     898.79    5752.27     0.385     22.66    145.02     0.010      1.48      9.45    0.0006

                                                                                           0.163                        0.0231
 TOTAL FOR CYCLE                8.434                          9.196

                                                                                           0.019                        0.0027
 TOTAL FOR CYCLE/LB FUEL                                       1.090
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA *****************************************************************************************

     CAL ID NUMBER:  171    ENGINE TYPE AND MODEL:  O-200-A                SERIAL NUMBER:   213378-71AC

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:     44. HRS

     FUEL: AV GAS 80/87               FUEL H/C RATIO:    1.840

OPERATIONAL DATA ************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    72.00   FINISH   75.50

     ATMOSPHERIC PRESSURE:              START    30.23   FINISH   30.23

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     73.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.0C,  FLOW RATE, LITERS/MIN:     7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:



                     CARB.     TEST      ENGINE       MEASURED        MEASURED       CALCULATED
                     HEATER    MODE       RPM         FUEL FLOW       AIR FLOW          F/A
                                                        LB/HR           LB/HR

IDLE-LOW                        1         -0.0          3.90           46.00          0.05636
IDLE/TAXI                       2         -0.0          6.40           75.00          0.06201
RUN UP                          3         -0.0         13.20          156.00          0.06545
RUN UP-LEAN                     4         -0.0         15.00          178.00          0.06318
RUN UP-RICH                     5         -0.0         12.40          147.00          0.06626
TAKE-OFF                        6         -0.0         49.60          553.00          0.07795
CLIMB                           7         -0.0         49.60          553.00          0.07795
DESCENT                         8         -0.0         35.50          425.00          0.07044
DESCENT               ON        8         -0.0         42.00          422.00          0.08328
APPROACH                        9         -0.0         21.10          228.00          0.07568
TAXI                           10         -0.0          5.60           64.00          0.06894


 TEST   EXHAUST    EXHAUST      CO          CO        THC       NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
 MODE     GAS        GAS       (DRY)         2       (DRY)     (DRY)       2         X       (DRY)
          TEMP     PRESSURE  PERCENT V    (DRY)      PPMV      PPMV     (DRY)     (DRY)
       DEGREES F     PSIA              PERCENT V                         PPMV      PPMV

   1     -0.00      -0.00       5.00       6.70    4124.00     15.00     -0.00     -0.00     23.00      -0.00        -0.00
   2     -0.00      -0.00       6.00       7.00    3385.00     49.00     -0.00     -0.00     16.00      -0.00        -0.00
   3     -0.00      -0.00       6.50       7.30    2954.00    142.00     -0.00     -0.00     -0.00      -0.00        -0.00
   4     -0.00      -0.00       6.00       7.30    3077.00     85.00     -0.00     -0.00     -0.00      -0.00        -0.00
   5     -0.00      -0.00       6.40       7.60    2893.90     99.00     -0.00     -0.00     -0.00      -0.00        -0.00
   6     -0.00      -0.00       9.10       7.40    2770.00    203.00     -0.00     -0.00     -0.00      -0.00        -0.00
   7     -0.00      -0.00       9.10       7.40    2770.00    203.00     -0.00     -0.00      8.00      -0.00        -0.00
   8     -0.00      -0.00       6.80       8.20    2277.00    287.00     -0.00     -0.00      9.00      -0.00        -0.00
   8     -0.00      -0.00      11.70       5.80    2770.00    178.00     -0.00     -0.00     11.00      -0.00        -0.00
   9     -0.00      -0.00       9.40       6.60    2277.00     89.00     -0.00     -0.00      8.00      -0.00        -0.00
  10     -0.00      -0.00       7.40       7.20    2339.00     52.00     -0.00     -0.00     10.00      -0.00        -0.00


 TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE      CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
         LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
        LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1     833.95     39.39      0.0    1755.84      0.41      0.41    3252.42    153.64      0.0     6847.77      1.60      1.60
   2     908.75     29.36      0.0    1665.83      1.22      1.22    5816.02    187.92      0.0    10661.32      7.80      7.80
   3     931.62     24.25      0.0    1643.94      3.34      3.34   12297.36    320.08      0.0    21699.96     44.13     44.13
   4     890.78     26.16      0.0    1702.86      2.07      2.07   13361.63    392.45      0.0    25542.84     31.09     31.09
   5     904.84     23.43      0.0    1688.27      2.30      2.30   11219.99    290.47      0.0    20934.54     28.51     28.51
   6    1095.79     19.10      0.0    1400.09      4.02      4.02   54351.38    947.53      0.0    69444.63    199.15    199.15
   7    1095.79     19.10      0.0    1400.09      4.02      4.02   54351.38    947.53      0.0    69444.61    199.15    199.15
   8     902.15     17.30      0.0    1709.31      6.25      6.25   32026.15    614.19      0.0    60680.34    222.02    222.02
   8    1329.63     18.03      0.0    1035.64      3.32      3.32   55844.25    757.21      0.0    43496.96    139.55    139.55
   9    1170.23     16.24      0.0    1291.00      1.82      1.82   24691.92    342.56      0.0    27240.13     38.40     38.40
  10    1007.81     18.24      0.0    1540.70      1.16      1.16    5643.73    102.17      0.0     8627.93      6.51      6.51


                                                  LTU CYCLE EMISSIONS

 TEST    TIME IN   MEASURED    FUEL       CO        CO        CO        HC        HC        HC        NO        NO        NO
 MODE     MODE    FUEL FLOW    USED     LB/1K     LB/1K    EMISSION   LB/1K     LB/1K    EMISSION   LB/1K     LB/1K    EMISSION
          MIN.      LB/HR      LBS.    LB FUEL    HOURS      LBS.    LB FUEL    HOURS      LBS.    LB FUEL    HOURS      LBS.

   2     12.00       6.40      1.28     908.75   5816.02    1.163     29.36    187.92    0.038      1.22      7.80    0.0016
   6      0.30      49.60      0.25    1095.79  54351.38    0.272     19.10    947.53    0.005      4.02    199.15    0.0010
   7      5.00      49.60      4.12    1095.79  54351.38    4.511     19.10    947.53    0.079      4.02    199.15    0.0165
   9      6.00      21.10      2.11    1170.23  24691.92    2.469     16.24    342.56    0.034      1.82     38.40    0.0038
  10      4.00       5.60      0.38    1007.81   5643.73    0.378     18.24    102.17    0.007      1.16      6.51    0.0004

 TOTAL FOR CYCLE                8.130                       8.793                        0.162                        0.0234

 TOTAL FOR CYCLE/LB FUEL                                    1.082                        0.020                        0.0029
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************************

    CAL ID NUMBER:  172    ENGINE TYPE AND MODEL:  O-200-A                  SERIAL NUMBER:   205317-9-AA

                           RATED HORSEPOWER:   100.

    ENGINE TOTAL TIME:    289. HRS

    FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   78.50   FINISH   78.00

     ATMOSPHERIC PRESSURE:              START   30.30   FINISH   30.30

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     67.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:



                  CARB.    TEST      ENGINE       MEASURED      MEASURED       CALCULATED
                  HEATER   MODE       RPM         FUEL FLOW     AIR FLOW          F/A
                                                   LB/HR         LB/HR

IDLE-LOW                     1       -0.0          4.70         52.00         0.06634
IDLE/TAXI                    2       -0.0          8.10         90.00         0.06347
RUN UP                       3       -0.0         16.70        191.00         0.06990
RUN UP-LEAN                  4       -0.0         16.70        195.00         0.06525
RUN UP-RICH                  5       -0.0         15.80        180.00         0.06986
TAKE-OFF                     6       -0.0         50.60        544.00         0.08577
CLIMB                        7       -0.0         50.60        544.00         0.08577
DESCENT                      8       -0.0         35.50        419.00         0.07344
DESCENT            ON        8       -0.0         44.80        468.00         0.08624
APPROACH                     9       -0.0         22.90        250.00         0.07326
TAXI                        10       -0.0          7.20         84.00         0.06710


 TEST   EXHAUST     EXHAUST      CO          CO         THC        NO         NO         NO     ALDEHYDES     SMOKE     PARTICULATES
 MODE     GAS         GAS       (DRY)         2        (DRY)      (DRY)        2          X       (DRY)
         TEMP      PRESSURE   PERCENT V    (DRY)       PPMV       PPMV       (DRY)      (DRY)
       DEGREES F     PSIA                PERCENT V                           PPMV       PPMV

   1    247.00      -0.00        6.90        6.60    7396.00       9.00     -0.00      -0.00      21.00       -0.00        -0.00
   2    336.00      -0.00        7.30        6.00    2853.00      27.00     -0.00      -0.00      13.00       -0.00        -0.00
   3    572.00      -0.00        7.70        7.10    2325.00      84.00     -0.00      -0.00      -0.00       -0.00        -0.00
   4    558.00      -0.00        6.70        7.10    2377.00      78.00     -0.00      -0.00      -0.00       -0.00        -0.00
   5    594.00      -0.00        7.80        7.00    2166.00      64.00     -0.00      -0.00      -0.00       -0.00        -0.00
   6   1065.00      -0.00       10.90        7.30    2377.00     409.00     -0.00      -0.00      -0.00       -0.00        -0.00
   7   1065.00      -0.00       10.90        7.30    2377.00     409.00     -0.00      -0.00       8.00       -0.00        -0.00
   8   1009.00      -0.00        7.60        8.10    1638.00     186.00     -0.00      -0.00       8.00       -0.00        -0.00
   8    986.00      -0.00       11.30        6.80    3962.00     473.00     -0.00      -0.00      13.00       -0.00        -0.00
   9    807.00      -0.00        8.90        6.60    2113.00      74.00     -0.00      -0.00       9.00       -0.00        -0.00
  10    381.00      -0.00        7.20        7.00    2272.00      43.00     -0.00      -0.00      11.00       -0.00        -0.00


 TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE       CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1      978.93     60.10      0.0    1471.25      0.21      0.21   4600.98    282.45      0.0    6914.86      0.99      0.99
   2     1085.56     24.30      0.0    1401.92      0.66      0.66   8793.07    196.82      0.0   11355.52      5.34      5.34
   3     1034.81     17.90      0.0    1499.23      1.85      1.85  17281.34    298.85      0.0   25037.06     30.97     30.97
   4      964.23     19.59      0.0    1605.47      1.84      1.84  16102.63    327.19      0.0   26811.36     30.79     30.79
   5     1049.36     16.69      0.0    1479.68      1.41      1.41  16579.89    263.69      0.0   23378.88     22.35     22.35
   6     1194.32     14.92      0.0    1256.77      7.36      7.36  60432.72    754.78      0.0   63592.62    372.47    372.47
   7     1194.32     14.92      0.0    1256.77      7.36      7.36  60432.72    754.78      0.0   63592.62    372.47    372.47
   8      967.85     11.95      0.0    1620.76      3.89      3.89  34358.69    424.11      0.0   57536.85    138.12    138.12
   8     1234.23     24.78      0.0    1166.99      8.49      8.49  55293.67   1110.34      0.0   52281.05    380.17    380.17
   9     1144.41     15.56      0.0    1333.44      1.56      1.56  26206.86    356.34      0.0   30535.66     35.79     35.79
  10     1008.21     18.22      0.0    1540.13      0.99      0.99   7259.13    131.19      0.0   11088.90      7.12      7.12


                                              LTO CYCLE EMISSIONS

 TEST     TIME IN   MEASURED     FUEL       CO         CO         CO         HC        HC         HC        NO        NO        NO
 MODE      MODE     FUEL FLOW    USED      LB/1K      LB/1K    EMISSION     LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION
           MIN.       LB/HR      LBS.     LB FUEL     HOURS      LBS.      LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.

   2      12.00       8.10       1.62     1085.56    8793.07     1.759      24.30     196.82     0.039      0.66       5.34    0.0011
   6       0.30      50.60       0.25     1194.32   60432.72     0.302      14.92     754.78     0.004      7.36     372.47    0.0019
   7       5.00      50.60       4.20     1194.32   60432.72     5.016      14.92     754.78     0.063      7.36     372.47    0.0309
   9       6.00      22.90       2.29     1144.41   26206.86     2.621      15.56     356.34     0.036      1.56      35.79    0.0036
  10       4.00       7.20       0.48     1008.21    7259.13     0.486      18.22     131.19     0.009      0.99       7.12    0.0005

TOTAL FOR CYCLE                  8.845                          10.184                          0.150                         0.0379

TOTAL FOR CYCLE/LB FUEL                                          1.151                          0.017                         0.0043
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:  173    ENGINE TYPE AND MODEL:  O-200-A              SERIAL NUMBER:   205317-9-AB

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:    299. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   79.00   FINISH   78.50

     ATMOSPHERIC PRESSURE:              START   30.28   FINISH   30.28

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     65.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:     1.60

NUMBER OF TESTS:  11

COMMENTS:



                         CARB.    TEST     ENGINE       MEASURED        MEASURED       CALCULATED
                        HEATER    MODE      RPM         FUEL FLOW       AIR FLOW          F/A
                                                          LB/HR           LB/HR

IDLE-LOW                            1       -0.0           3.90           45.00         0.06132
IDLE/TAXI                           2       -0.0           7.20           84.00         0.06169
RUN UP                              3       -0.0          16.70          194.00         0.06616
RUN UP-LEAN                         4       -0.0          15.80          185.00         0.06338
RUN UP-RICH                         5       -0.0          14.10          170.00         0.06394
TAKE-OFF                            6       -0.0          49.60          537.00         0.08339
CLIMB                               7       -0.0          49.60          537.00         0.08339
DESCENT                             8       -0.0          35.50          420.00         0.07207
DESCENT                   ON        8       -0.0          44.80          465.00         0.08250
APPROACH                            9       -0.0          22.00          239.00         0.07061
TAXI                               10       -0.0           6.40           74.00         0.06348


  TEST   EXHAUST    EXHAUST      CO         CO          THC        NO         NO         NO       ALDEHYDES     SMOKE     PARTICULATES
  MODE     GAS        GAS       (DRY)        2         (DRY)      (DRY)        2          X         (DRY)
          TEMP     PRESSURE   PERCENT V    (DRY)       PPMV       PPMV       (DRY)      (DRY)
        DEGREES F    PSIA               PERCENT V                            PPMV       PPMV

   1     202.00     -0.00        5.60       7.00     5916.00      17.00      -0.00      -0.00      21.00       -0.00        -0.00
   2     336.00     -0.00        6.30       6.70     2497.00      41.00      -0.00      -0.00      13.00       -0.00        -0.00
   3     560.00     -0.00        6.90       7.10     2334.00     104.00      -0.00      -0.00      -0.00       -0.00        -0.00
   4     527.00     -0.00        6.30       7.00     3311.00      83.00      -0.00      -0.00      -0.00       -0.00        -0.00
   5     577.00     -0.00        6.00       7.60     1900.00      85.00      -0.00      -0.00      -0.00       -0.00        -0.00
   6    1054.00     -0.00       10.50       7.20     2225.00     292.00      -0.00      -0.00      -0.00       -0.00        -0.00
   7    1054.00     -0.00       10.50       7.20     2225.00     292.00      -0.00      -0.00       9.00       -0.00        -0.00
   8    1020.00     -0.00        7.40       8.00     1628.00     193.00      -0.00      -0.00       8.00       -0.00        -0.00
   8    1009.00     -0.00       11.10       6.30     2551.00     158.00      -0.00      -0.00       7.00       -0.00        -0.00
   9     818.00     -0.00        9.70       6.20     2171.00      77.00      -0.00      -0.00      14.00       -0.00        -0.00
  10     415.00     -0.00        6.70       6.70     2334.00      43.00      -0.00      -0.00       9.00       -0.00        -0.00


  TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K     LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1      857.62      51.89       0.0      1684.38      0.43       0.43     3344.70     202.37      0.0      6569.09      1.67       1.67
   2      960.59      21.81       0.0      1605.12      1.03       1.03     6916.22     157.00      0.0     11556.89      7.39       7.39
   3      979.36      18.97       0.0      1583.40      2.42       2.42    16355.30     316.85      0.0     26442.71     40.49      40.49
   4      933.71      28.10       0.0      1630.07      2.02       2.02    14752.60     444.05      0.0     25755.14     31.92      31.92
   5      879.00      15.94       0.0      1749.40      2.00       2.00    12393.90     224.78      0.0     24666.53     28.16      28.16
   6     1183.57      14.36       0.0      1275.19      5.41       5.41    58704.88     712.46      0.0     63249.28    268.16     268.16
   7     1183.57      14.36       0.0      1275.19      5.41       5.41    58704.88     712.46      0.0     63249.29    268.16     268.16
   8      960.61      12.10       0.0      1631.71      4.12       4.12    34101.55     429.68      0.0     57925.40    146.09     146.09
   8     1270.15      16.72       0.0      1132.69      2.97       2.97    56902.63     748.97      0.0     50744.43    133.04     133.04
   9     1162.66      16.62       0.0      1301.86      1.69       1.69    25578.50     365.56      0.0     28640.85     37.18      37.18
  10      992.82      19.81       0.0      1559.95      1.05       1.05     6354.07     126.77      0.0      9983.67      6.70       6.70


                                                   LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL        CO         CO         CO         HC         HC         HC         NO         NO         NO
  MODE     MODE     FUEL FLOW   USED      LB/1K      LB/1K    EMISSION    LB/1K      LB/1K    EMISSION    LB/1K      LB/1K    EMISSION
           MIN.      LB/HR      LBS.     LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.

   2      12.00       7.20      1.44      960.59    6916.22     1.383      21.81     157.00     0.031       1.03       7.39     0.0015
   6       0.30      49.60      0.25     1183.57   58704.88     0.294      14.36     712.46     0.004       5.41     268.16     0.0013
   7       5.00      49.60      4.17     1183.57   58704.88     4.873      14.36     712.46     0.059       5.41     268.16     0.0223
   9       6.00      22.00      2.20     1162.66   25578.50     2.558      16.62     365.56     0.037       1.69      37.18     0.0037
  10       4.00       6.40      0.43      992.82    6354.07     0.426      19.81     126.77     0.008       1.05       6.70     0.0004

TOTAL FOR CYCLE                 8.434                         9.533                           0.139                           0.0292

TOTAL FOR CYCLE/LB FUEL                                       1.130                           0.016                           0.0035
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:  174    ENGINE TYPE AND MODEL:  O-200-A                 SERIAL NUMBER:   205317-9-AC

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:    290. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA **********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   80.50   FINISH   80.00

     ATMOSPHERIC PRESSURE:              START   30.28   FINISH   30.28

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     64.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:



                       CARB.    TEST      ENGINE       MEASURED       MEASURED       CALCULATED
                       HEATER   MODE       RPM        FUEL FLOW       AIR FLOW          F/A
                                                        LB/HR          LB/HR

IDLE-LOW                          1        -0.0          3.90          44.00         0.06605
IDLE/TAXI                         2        -0.0          7.20          82.00         0.07065
RUN UP                            3        -0.0         15.80         177.00         0.07172
RUN UP-LEAN                       4        -0.0         15.80         182.00         0.07008
RUN UP-RICH                       5        -0.0         16.70         186.00         0.07392
TAKE-OFF                          6        -0.0         49.60         554.00         0.08237
CLIMB                             7        -0.0         49.60         554.00         0.08237
DESCENT                           8        -0.0         35.50         424.00         0.07565
DESCENT                 ON        8        -0.0         43.90         419.00         0.09084
APPROACH                          9        -0.0         22.00         234.00         0.07646
TAXI                             10        -0.0          6.40          71.00         0.07296


  TEST   EXHAUST     EXHAUST      CO        CO        THC        NO        NO        NO      ALDEHYDES    SMOKE     PARTICULATES
  MODE     GAS         GAS       (DRY)       2       (DRY)     (DRY)       2         X        (DRY)
          TEMP      PRESSURE  PERCENT V   (DRY)      PPMV      PPMV     (DRY)     (DRY)
        DEGREES F     PSIA              PERCENT V                        PPMV      PPMV

   1     224.00      -0.00       6.10      7.20    9199.00     15.00     -0.00     -0.00     32.00      -0.00         -0.00
   2     392.00      -0.00       7.70      7.10    3935.00     38.00     -0.00     -0.00     16.00      -0.00         -0.00
   3     673.00      -0.00       8.20      6.90    3066.00     72.00     -0.00     -0.00     -0.00      -0.00         -0.00
   4     617.00      -0.00       7.50      7.30    2849.00     65.00     -0.00     -0.00     -0.00      -0.00         -0.00
   5     717.00      -0.00       8.60      7.00    2849.00     68.00     -0.00     -0.00     -0.00      -0.00         -0.00
   6    1021.00      -0.00       9.60      7.90    2632.00    435.00     -0.00     -0.00     -0.00      -0.00         -0.00
   7    1021.00      -0.00       9.60      7.90    2632.00    435.00     -0.00     -0.00      9.00      -0.00         -0.00
   8    1065.00      -0.00       7.50      8.70    1872.00    208.00     -0.00     -0.00     11.00      -0.00         -0.00
   8    1020.00      -0.00      12.90      5.70    7734.00     84.00     -0.00     -0.00     18.00      -0.00         -0.00
   9     852.00      -0.00       9.70      6.40    2795.00     68.00     -0.00     -0.00     10.00      -0.00         -0.00
  10     482.00      -0.00       8.40      6.90    3718.00     59.00     -0.00     -0.00      9.00      -0.00         -0.00


  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1      866.63     74.85      0.0    1607.22      0.35      0.35   3379.87    291.91      0.0    6268.17      1.37      1.37
   2     1023.85     29.97      0.0    1483.34      0.83      0.83   7371.69    215.76      0.0   10680.04      5.98      5.98
   3     1075.25     23.03      0.0    1421.62      1.55      1.55  16988.92    363.81      0.0   22461.52     24.50     24.50
   4     1004.43     21.85      0.0    1536.10      1.43      1.43  15870.03    345.27      0.0   24270.43     22.59     22.59
   5     1073.74     20.75      0.0    1398.79      1.42      1.42  18265.52    346.55      0.0   23359.83     23.72     23.72
   6     1091.82     17.14      0.0    1411.71      8.13      8.13  54154.37    850.34      0.0   70020.98    403.06    403.06
   7     1091.82     17.14      0.0    1411.71      8.13      8.13  54154.37    850.34      0.0   70020.88    403.06    403.06
   8      924.61     13.22      0.0    1685.21      4.21      4.21  32823.64    469.22      0.0   59825.01    149.52    149.52
   8     1345.20     46.19      0.0     933.92      1.44      1.44  59054.12   2027.73      0.0   40999.05     63.16     63.16
   9     1196.39     19.74      0.0    1240.28      1.38      1.38  26320.59    434.36      0.0   27286.13     30.31     30.31
  10     1082.84     27.45      0.0    1397.56      1.25      1.25   6930.14    175.68      0.0    8944.38      8.00      8.00


                                                   LTO CYCLE EMISSIONS

  TEST   TIME IN   MEASURED     FUEL       CO        CO        CO        HC        HC        HC        NO        NO        NO
  MODE    MODE    FUEL FLOW     USED     LB/1K     LB/1K    EMISSION   LB/1K     LB/1K    EMISSION   LB/1K     LB/1K    EMISSION
          MIN.      LB/HR       LBS.    LB FUEL    HOURS      LBS.    LB FUEL    HOURS      LBS.    LB FUEL    HOURS      LBS.

   2      12.00      7.20       1.44    1023.85   7371.69    1.474     29.97    215.76    0.043      0.83      5.98    0.0012
   6       0.30     49.60       0.25    1091.82  54154.37    0.271     17.14    850.34    0.004      8.13    403.06    0.0020
   7       5.00     49.60       4.12    1091.82  54154.37    4.495     17.14    850.34    0.071      8.13    403.06    0.0335
   9       6.00     22.00       2.20    1196.39  26320.59    2.632     19.74    434.36    0.043      1.38     30.31    0.0030
  10       4.00      6.40       0.43    1082.84   6930.14    0.464     27.45    175.68    0.012      1.25      8.00    0.0005

TOTAL FOR CYCLE                 8.434                        9.336                        0.173                        0.0402

TOTAL FOR CYCLE/LB FUEL                                      1.107                        0.021                        0.0048
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:  181    ENGINE TYPE AND MODEL:  O-200-A                  SERIAL NUMBER:   213 175-70-AA

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:    311. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA **********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   74.00   FINISH   75.80

     ATMOSPHERIC PRESSURE:              START   29.92   FINISH   29.92

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     73.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  10

COMMENTS:



                   CARB.     TEST      ENGINE       MEASURED        MEASURED       CALCULATED
                   HEATER    MODE       RPM         FUEL FLOW       AIR FLOW          F/A
                                                     LB/HR           LB/HR

IDLE-LOW                       1        -0.0           4.70           59.00          0.05952
IDLE/TAXI                      2        -0.0           7.20           87.00          0.06385
RUN UP                         3        -0.0          15.80          200.00          0.06262
RUN UP-RICH                    5        -0.0          15.00           -0.00          0.06402
TAKE-OFF                       6        -0.0          48.60          513.00          0.08133
CLIMB                          7        -0.0          48.60          513.00          0.08133
DESCENT             ON         8        -0.0          40.10          424.00          0.07878
APPROACH                       9        -0.0          22.00          243.00          0.07273
TAXI                          10        -0.0           6.40           79.00          0.06392
RUN UP-LEAN                    4        -0.0          15.40           -0.00          0.05756


  TEST   EXHAUST     EXHAUST      CO          CO         THC       NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS         GAS       (DRY)         2        (DRY)     (DRY)       2         X       (DRY)
          TEMP      PRESSURE   PERCENT V    (DRY)       PPMV      PPMV     (DRY)     (DRY)
        DEGREES F     PSIA                PERCENT V                         PPMV      PPMV

    1    314.00      -0.00        4.30        8.10   4750.00     15.00     -0.00     -0.00     20.00      -0.00        -0.00
    2    404.00      -0.00        5.80        7.60   3726.00     -0.00     -0.00     -0.00     10.00      -0.00        -0.00
    3    628.00      -0.00        4.70        8.60   3157.00    205.00     -0.00     -0.00     -0.00      -0.00        -0.00
    5    673.00      -0.00        4.90        8.70   2816.00    133.00     -0.00     -0.00     -0.00      -0.00        -0.00
    6   1099.00      -0.00       10.50        6.60   3328.00     92.00     -0.00     -0.00     -0.00      -0.00        -0.00
    7   1099.00      -0.00       10.50        6.60   3328.00     92.00     -0.00     -0.00      6.00      -0.00        -0.00
    8   1031.00      -0.00       10.00        4.40   3669.00    203.00     -0.00     -0.00      3.00      -0.00        -0.00
    9   1087.00      -0.00        8.50        6.80   3157.00     71.00     -0.00     -0.00      6.00      -0.00        -0.00
   10    448.00      -0.00        5.30        8.20   3271.00     58.00     -0.00     -0.00      6.00      -0.00        -0.00
    4    670.00      -0.00        4.50        7.60   3210.00    190.00     -0.00     -0.00     -0.00      -0.00        -0.00


  TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
           LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
          LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    1     674.72     42.69       0.0   1997.00      0.39      0.39   3171.18    200.63       0.0   9385.89      1.82      1.82
    2     850.77     31.30       0.0   1751.61     -0.00     -0.00   6125.56    225.38       0.0  12611.60     -0.00     -0.00
    3     697.36     26.83       0.0   2004.93      5.00      5.00  11018.36    423.88       0.0  31677.84     78.94     78.94
    5     713.11     23.47       0.0   1989.39      3.18      3.18  10696.69    352.07       0.0  29840.83     47.69     47.69
    6    1216.81     22.09       0.0   1201.76      1.75      1.75  59137.13   1073.49       0.0  58405.43     85.11     85.11
    7    1216.81     22.09       0.0   1201.76      1.75      1.75  59137.13   1073.49       0.0  58405.43     85.11     85.11
    8    1204.90     25.32       0.0   1211.62      4.02      4.02  48316.27   1015.28       0.0  48586.06    161.11    161.11
    9    1099.66     23.39       0.0   1382.25      1.51      1.51  24192.56    514.61       0.0  30409.57     33.19     33.19
   10     774.37     27.37       0.0   1882.45      1.39      1.39   4955.94    175.18       0.0  12047.66      8.91      8.91
    4     731.91     29.90       0.0   1942.21      5.08      5.08  11271.41    460.49       0.0  29910.08     78.17     78.17


                                                   LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED     FUEL       CO         CO         CO        HC        HC         HC        NO        NO        NO
  MODE     MODE     FUEL FLOW    USED      LB/1K      LB/1K    EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K   EMISSION
           MIN.      LB/HR       LBS.     LB FUEL     HOURS      LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS     LBS.

    2      12.00      7.20       1.44     850.77    6125.56     1.225     31.30     225.38     0.045     -0.00     -0.00  -0.0000
    6       0.30     48.60       0.24    1216.81   59137.13     0.296     22.09    1073.49     0.005      1.75     85.11   0.0004
    7       5.00     48.60       4.03    1216.81   59137.13     4.908     22.09    1073.49     0.089      1.75     85.11   0.0071
    9       6.00     22.00       2.20    1099.66   24192.56     2.419     23.39     514.61     0.051      1.51     33.19   0.0033
   10       4.00      6.40       0.43     774.37    4955.94     0.332     27.37     175.18     0.012      1.39      8.91   0.0006

 TOTAL FOR CYCLE                 8.346                          9.180                          0.203                       -0.0000

 TOTAL FOR CYCLE/LB FUEL                                        1.100                          0.024                       -0.0000
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DATE:    7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  182    ENGINE TYPE AND MODEL:  O-200-A                    SERIAL NUMBER:   213 175-70-A8

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:    311. HRS

     FUEL: AV GAS 80/87             FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   75.80   FINISH   77.80

     ATMOSPHERIC PRESSURE:              START   29.93   FINISH   29.93

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     65.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:



                       CARB.    TEST     ENGINE       MEASURED       MEASURED      CALCULATED
                       HEATER   MODE     RPM          FUEL FLOW      AIR FLOW         F/A
                                                       LB/HR          LB/HR

IDLE-LOW                          1       -0.0           4.70          62.00        0.05345
IDLE/TAXI                         2       -0.0           7.20          92.00        0.06146
RUN UP                            3       -0.0          15.00         190.00        0.06709
RUN UP-LEAN                       4       -0.0          15.00         191.00        0.06403
RUN UP-RICH                       5       -0.0          15.00         198.00        0.06310
TAKE-OFF                          6       -0.0          49.60         515.00        0.08472
CLIMB                             7       -0.0          49.60         515.00        0.08472
DESCENT                           8       -0.0          33.70         398.00        0.07116
DESCENT                 ON        8       -0.0          40.10         405.00        0.08552
APPROACH                          9       -0.0          22.00         244.00        0.07609
TAXI                             10       -0.0           5.60          70.00        0.06374


  TEST   EXHAUST    EXHAUST      CO         CO          THC        NO         NO         NO     ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS        GAS       (DRY)        2         (DRY)      (DRY)        2          X       (DRY)
          TEMP     PRESSURE   PERCENT V    (DRY)       PPMV       PPMV       (DRY)      (DRY)
        DEGREES F    PSIA               PERCENT V                           PPMV       PPMV

   1     247.00     -0.00       2.80       8.30     4790.00      26.00      -0.00      -0.00     17.00      -0.00       -0.00
   2     381.00     -0.00       4.40       8.60     3229.00      60.00      -0.00      -0.00      9.00      -0.00       -0.00
   3     684.00     -0.00       5.00       9.30     2853.00     274.00      -0.00      -0.00     -0.00      -0.00       -0.00
   4     650.00     -0.00       4.70       8.90     2960.00     138.00      -0.00      -0.00     -0.00      -0.00       -0.00
   5     706.00     -0.00       3.90       9.60     2422.00     216.00      -0.00      -0.00     -0.00      -0.00       -0.00
   6    1087.00     -0.00      10.70       6.80     6728.00     106.00      -0.00      -0.00      6.00      -0.00       -0.00
   7    1087.00     -0.00      10.70       6.80     6728.00     106.00      -0.00      -0.00      5.00      -0.00       -0.00
   8    1054.00     -0.00       6.70       8.20     4844.00     213.00      -0.00      -0.00      9.00      -0.00       -0.00
   8    1043.00     -0.00      10.60       6.60    11303.00     298.00      -0.00      -0.00      4.00      -0.00       -0.00
   9     863.00     -0.00       8.70       7.00     6500.00      81.00      -0.00      -0.00      5.00      -0.00       -0.00
  10     448.00     -0.00       5.40       8.40       -0.00      62.00      -0.00      -0.00


  TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1      488.53      47.86       0.0     2275.35       0.75       0.75    2296.07     224.96       0.0    10694.11       3.50       3.50
   2      667.20      28.04       0.0     2048.99       1.49       1.49    4803.83     201.91       0.0    14752.72      10.76      10.76
   3      692.56      22.63       0.0     2023.99       6.23       6.23   10388.38     339.49       0.0    30359.79      93.51      93.51
   4      683.30      24.65       0.0     2033.01       3.30       3.30   10249.46     369.69       0.0    30495.18      49.43      49.43
   5      573.34      20.39       0.0     2217.46       5.22       5.22    8600.05     305.88       0.0    33261.84      78.24      78.24
   6     1189.50      42.84       0.0     1187.76       1.94       1.94   58999.11    2124.67       0.0    58912.67      96.00      96.00
   7     1189.50      42.84       0.0     1187.76       1.94       1.94   58999.11    2124.67       0.0    58912.67      96.00      96.00
   8      879.82      36.43       0.0     1691.90       4.59       4.59   29650.08    1227.72       0.0    57016.86     154.83     154.83
   8     1168.26      71.35       0.0     1142.92       5.39       5.39   46847.07    2860.98       0.0    45830.95     216.33     216.33
   9     1074.99      46.00       0.0     1359.00       1.64       1.64   23649.72    1011.96       0.0    29898.05      36.17      36.17
  10      790.53      -0.00       0.0     1932.15       1.49       1.49    4426.95      -0.00       0.0    10820.02       8.35       8.35


                                                    LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED     FUEL       CO         CO         CO         HC         HC         HC         NO         NO         NO
  MODE     MODE     FUEL FLOW    USED      LB/1K      LB/1K    EMISSION    LB/1K      LB/1K    EMISSION     LB/1K      LB/1K    EMISSION
           MIN.      LB/HR       LBS.     LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.

   2      12.00       7.20       1.44     667.20    4803.83     0.961      28.04     201.91     0.040      1.49      10.76     0.0022
   6       0.30      49.60       0.25    1189.50   58999.11     0.295      42.84    2124.67     0.011      1.94      96.00     0.0005
   7       5.00      49.60       4.12    1189.50   58999.11     4.897      42.84    2124.67     0.176      1.94      96.00     0.0080
   9       6.00      22.00       2.20    1074.99   23649.72     2.365      46.00    1011.96     0.101      1.64      36.17     0.0036
  10       4.00       5.60       0.38     790.53    4426.95     0.297      -0.00      -0.00    -0.000      1.49       8.35     0.0006

                                                                                  -0.000                           0.0148
 TOTAL FOR CYCLE                 8.380                          8.814

                                                                                  -0.000                           0.0018
 TOTAL FOR CYCLE/LB FUEL                                        1.052
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ***************************************************************************************************************

     CAL ID NUMBER:  183     ENGINE TYPE AND MODEL:  O-200-A                 SERIAL NUMBER:   213 175-70-AC

                             RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:    311. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA **********************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   77.80   FINISH   77.80

     ATMOSPHERIC PRESSURE:              START   29.94   FINISH   29.94

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     62.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.0C,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:



                     CARB.    TEST     ENGINE      MEASURED      MEASURED      CALCULATED
                     HEATER   MODE      RPM        FUEL FLOW     AIR FLOW         F/A
                                                    LB/HR         LB/HR

IDLE-LOW                        1       -0.0          4.70          62.00       0.04639
IDLE/TAXI                       2       -0.0          7.20          93.00       0.05305
RUN UP                          3       -0.0         15.00         194.00       0.05605
RUN UP-LEAN                     4       -0.0         14.10         180.00       0.05662
RUN UP-RICH                     5       -0.0         14.10         185.00       0.05545
TAKE-OFF                        6       -0.0         47.70         512.00       0.07178
CLIMB                           7       -0.0         47.70         512.00       0.07178
DESCENT                         8       -0.0         34.60         417.00       0.07042
DESCENT               ON        8       -0.0         40.10         418.00       0.08228
APPROACH                        9       -0.0         22.00         244.00       0.07402
TAXI                           10       -0.0          5.60          69.00       0.06421


   TEST    EXHAUST    EXHAUST      CO         CO        THC        NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
   MODE      GAS        GAS       (DRY)        2       (DRY)     (DRY)       2         X        (DRY)
            TEMP     PRESSURE  PERCENT V    (DRY)      PPMV      PPMV     (DRY)     (DRY)
          DEGREES F    PSIA               PERCENT V                        PPMV      PPMV

    1     258.00     -0.00       2.50       7.20    3007.00     19.00     -0.00     -0.00      15.00      -0.00        -0.00
    2     392.00     -0.00       3.90       7.40    1407.00     52.00     -0.00     -0.00       9.00      -0.00        -0.00
    3     695.00     -0.00       4.00       8.00    1186.00    298.00     -0.00     -0.00      -0.00      -0.00        -0.00
    4     661.00     -0.00       4.30       7.80    1297.00    144.00     -0.00     -0.00      -0.00      -0.00        -0.00
    5     717.00     -0.00       3.70       8.20    1021.00    186.00     -0.00     -0.00      -0.00      -0.00        -0.00
    6    1099.00     -0.00       9.20       6.00    1517.00    152.00     -0.00     -0.00      -0.00      -0.00        -0.00
    7    1099.00     -0.00       9.20       6.00    1517.00    152.00     -0.00     -0.00      10.00      -0.00        -0.00
    8    1054.00     -0.00       6.60       8.40    2383.00    253.00     -0.00     -0.00       7.00      -0.00        -0.00
    8    1043.00     -0.00      13.70       6.50    4256.00    234.00     -0.00     -0.00       8.00      -0.00        -0.00
    9     863.00     -0.00       9.60       7.00    3064.00     72.00     -0.00     -0.00       5.00      -0.00        -0.00
   10     426.00     -0.00       5.20       8.40    3022.00     83.00     -0.00     -0.00       4.00      -0.00        -0.00


   TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
   MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
            LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
           LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    1      505.02      34.79       0.0      2285.29      0.63       0.63     2373.61     163.51       0.0    10740.88      2.96       2.96
    2      688.67      14.23       0.0      2053.14      1.51       1.51     4958.45     102.45       0.0    14782.63     10.86      10.86
    3      666.82      11.32       0.0      2095.45      8.16       8.16    10002.31     169.85       0.0    31431.76    122.40     122.40
    4      710.32      12.27       0.0      2024.50      3.91       3.91    10015.52     173.02       0.0    28545.50     55.09      55.09
    5      622.80       9.84       0.0      2168.69      5.14       5.14     8781.43     138.78       0.0    30578.47     72.51      72.51
    6     1210.69      11.43       0.0      1240.61      3.29       3.29    57749.94     545.37       0.0    59177.05    156.72     156.72
    7     1210.69      11.43       0.0      1240.61      3.29       3.29    57749.94     545.37       0.0    59177.05    156.72     156.72
    8      875.00      18.09       0.0      1749.78      5.51       5.51    30275.07     626.05       0.0    60542.30    170.53     190.63
    8     1226.43      27.94       0.0      1170.60      4.41       4.41    49179.69    1120.34       0.0    46941.16    176.56     176.66
    9     1092.27      22.29       0.0      1396.90      1.50       1.50    24029.84     490.33       0.0    30731.84     33.04      33.04
   10      755.65      25.15       0.0      1917.94      1.98       1.99     4231.64     140.85       0.0    10740.48     11.09      11.09


                                                        LTO CYCLE EMISSIONS

   TEST    TIME IN   MEASURED     FUEL        CO         CO          CO         HC         HC         HC         NO         NO         NO
   MODE     MODE     FUEL FLOW    USED      LB/1K      LB/1K     EMISSION     LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION
            MIN.       LB/HR      LBS.     LB FUEL     HOURS       LBS.      LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.

    2      12.00       7.20       1.44      688.67    4958.45     0.992       14.23     102.45      0.020      1.51       10.86     0.0022
    6       0.30      47.70       0.24     1210.69   57749.94     0.289       11.43     545.37      0.003      3.29      156.72     0.0008
    7       5.00      47.70       3.96     1210.69   57749.94     4.793       11.43     545.37      0.045      3.29      156.72     0.0130
    9       6.00      22.00       2.20     1092.27   24029.84     2.403       22.29     490.33      0.049      1.50       33.04     0.0033
   10       4.00       5.60       0.38      755.65    4231.64     0.284       25.15     140.85      0.009      1.98       11.09     0.0007

TOTAL FOR CYCLE                   8.213                           8.760                           0.127                            0.0200

TOTAL FOR CYCLE/LB FUEL                                           1.067                           0.015                            0.0024
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL
ENGINE DATA ********************************************************************************************
     CAL ID NUMBER:  184    ENGINE TYPE AND MODEL:  O-200-A                SERIAL NUMBER:   199599-9-AA

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:    809. HRS      *

     FUEL: AV GAS 80/87            FUEL H/C RATIO:    1.840
OPERATIONAL DATA ***************************************************************************************
      INLET AIR TEMPERATURE, DEGREES F:  START   79.80   FINISH   79.80

      ATMOSPHERIC PRESSURE:              START   3C.03   FINISH   30.03

      INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

      RELATIVE HUMIDITY:                    58.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

      SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  11

 COMMENTS:



                      CARB.    TEST     ENGINE      MEASURED      MEASURED      CALCULATED
                      HEATER   MODE      RPM        FUEL FLOW     AIR FLOW         F/A
                                                     LB/HR         LB/HR

 IDLE-LOW                       1        -0.0         4.70          53.0C       0.06934
 IDLE/TAXI                      2        -0.0         7.20          87.00       0.06558
 RUN UP                         3        -0.0        14.10         169.00       0.06684
 RUN UP-LEAN                    4        -0.0        14.10         170.00       0.06848
 RUN UP-RICH                    5        -0.0        14.1C         171.00       0.06752
 TAKE-OFF                       6        -0.0        44.80         506.00       0.07667
 CLIMB                          7        -0.0        44.80         506.00       0.07667
 DESCENT                        8        -0.0        38.30         453.00       0.06893
 DESCENT              ON        8        -0.0        36.40         375.00       0.07801
 APPROACH                       9        -0.0        21.10         234.00       0.07099
 TAXI                          10        -0.0         5.60          68.00       0.06754

   TEST   EXHAUST    FXHAUST      CO        CO         THC       NO       NO       NO     ALDEHYDES   SMOKE   PARTICULATES
   MODE     GAS        GAS       (DRY)       2        (DRY)     (DRY)      2        X       (DRY)
            TEMP     PRESSURE  PERCENT V  (DRY)       PPMV      PPMV    (DRY)    (DRY)
         DEGREES F     PSIA               PERCENT V                     PPMV     PPMV

    1     291.00     -0.00       7.20      7.10    6155.00     16.00    -0.00    -0.00     11.00     -0.00      -0.00
    2     392.00     -0.00       6.20      7.70    2495.00     32.00    -0.00    -0.00      7.00     -0.00      -0.00
    3     661.00     -0.00       6.40      7.80    2274.00    144.00    -0.00    -0.00     -0.00     -0.00      -0.00
    4     673.00     -0.00       6.50      8.10    1996.00    131.00    -0.00    -0.00     -0.00     -0.00      -0.00
    5     684.00     -0.00       6.30      8.10    1941.00    136.00    -0.00    -0.00     -0.00     -0.00      -0.00
    6    1143.00     -0.00       8.80      7.50    2107.00    237.00    -0.00    -0.00      0.0      -0.00      -0.00
    7    1143.00     -0.00       8.80      7.50    2107.00    237.00    -0.00    -0.00      4.00     -0.00      -0.00
    8     998.00     -0.00       7.00      7.70    1664.00    178.00    -0.00    -0.00      4.00     -0.00      -0.00
    8     964.00     -0.00      10.60      5.80    2606.00     59.00    -0.00    -0.00      6.00     -0.00      -0.00
    9     830.00     -0.00       8.40      6.60    2274.00     75.00    -0.00    -0.00      9.00     -0.00      -0.00
   10     448.00     -0.00       6.20      8.20    2052.00     97.00    -0.00    -0.00

   TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
   MODE       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
            LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
           LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    1      975.21     47.75      0.0     1510.99     0.36      0.36    4583.47    224.41      0.0     7101.63     1.67      1.67
    2      885.22     20.40      0.0     1727.39     0.75      0.75    6373.60    146.90      0.0    12437.18     5.40      5.40
    3      896.18     18.24      0.0     1716.12     3.31      3.31   12636.09    257.14      0.0    24197.23    46.70     46.70
    4      887.29     15.60      0.0     1737.30     2.94      2.94   12510.77    220.03      0.0    24495.94    41.42     41.42
    5      872.10     15.39      0.0     1761.76     3.09      3.09   12296.57    216.98      0.0    24840.85    43.60     43.60
    6     1076.76     14.77      0.0     1441.90     4.76      4.76   48238.84    661.49      0.0    64597.17   213.39    213.39
    7     1076.76     14.77      0.0     1441.90     4.76      4.76   48238.84    661.49      0.0    64597.17   213.39    213.39
    8      951.25     12.95      0.0     1644.09     3.97      3.97   36432.81    496.01      0.0    62968.55   152.17    152.17
    8     1285.34     18.10      0.0     1105.04     1.18      1.18   46786.24    658.77      0.0    40223.40    42.77     42.77
    9     1114.44     17.28      0.0     1375.81     1.63      1.63   23514.60    364.58      0.0    29029.55    34.49     34.49
   10      857.60     16.26      0.0     1782.16     2.20      2.20    4802.57     91.03      0.0     9980.08    12.34     12.34

                                                 LTO CYCLE EMISSIONS

   TEST   TIME IN   MEASURED    FUEL       CO         CO        CO         HC        HC        HC         NO        NO         NO
   MODE    MODE    FUEL FLOW    USED      LB/1K      LB/1K    EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION
           MIN.      LB/HR      LBS.     LB FUEL     HOURS      LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.

    2     12.00      7.20       1.44     885.22    6373.60     1.275     20.40     146.90     0.029      0.75       5.40    0.0011
    6      0.30     44.80       0.22    1076.76   48238.84     0.241     14.77     661.49     0.003      4.76     213.39    0.0011
    7      5.00     44.80       3.72    1076.76   48238.84     4.004     14.77     661.49     0.055      4.76     213.39    0.0177
    9      6.00     21.10       2.11    1114.44   23514.60     2.351     17.28     364.58     0.036      1.63      34.49    0.0034
   10      4.00      5.60       0.38     857.60    4802.57     0.322     16.26      91.03     0.006      2.20      12.34    0.0008

 TOTAL FOR CYCLE                7.868                          8.193                          0.130                        0.0241

 TOTAL FOR CYCLE/LB FUEL                                       1.041                          0.017                        0.0031
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DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 185 ENGINE TYPE AND MODEL: O-200-A SERIAL NUMBER: 199599-9-A8

RATED HORSEPOWER: 100.

ENGINE TOTAL TIME: 809. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 78.00 FINISH 79.90

ATMOSPHERIC PRESSURE: START 30.03 FINISH 30.03

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 56.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	4.70	58.00	0.06090
IDLE/TAXI		2	-0.0	7.20	91.00	0.06254
RUN UP		3	-0.0	13.20	168.00	0.06360
RUN UP-LEAN		4	-0.0	13.20	166.00	0.06286
RUN UP-RICH		5	-0.0	13.20	171.00	0.06156
TAKE-OFF		6	-0.0	31.80	470.00	0.05663
CLIMB		7	-0.0	31.80	470.00	0.05663
DESCENT		8	-0.0	26.40	370.00	0.05802
DESCENT	ON	8	-0.0	37.40	385.00	0.07664
APPROACH		9	-0.0	17.60	210.00	0.06544
TAXI		10	-0.0	6.40	79.00	0.06616

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	247.00	-0.00	4.80	7.90	4575.00	22.00	-0.00	-0.00	13.00	-0.00	-0.00
2	381.00	-0.00	4.90	8.40	2422.00	71.00	-0.00	-0.00	10.00	-0.00	-0.00
3	673.00	-0.00	5.00	8.60	1830.00	290.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	639.00	-0.00	5.10	8.30	2045.00	120.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	684.00	-0.00	4.40	8.80	1561.00	305.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1300.00	-0.00	1.10	11.30	382.00	1520.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1300.00	-0.00	1.10	11.30	382.00	1520.00	-0.00	-0.00	3.00	-0.00	-0.00
8	1110.00	-0.00	2.50	10.10	694.00	913.00	-0.00	-0.00	-0.00	-0.00	-0.00
8	986.00	-0.00	10.30	5.80	2697.00	82.00	-0.00	-0.00	2.00	-0.00	-0.00
9	863.00	-0.00	6.40	7.50	2045.00	111.00	-0.00	-0.00	6.00	-0.00	-0.00
10	460.00	-0.00	5.80	8.30	2153.00	123.00	-0.00	-0.00	6.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	737.00	40.23	0.0	1905.87	0.55	0.55	3463.92	189.09	0.0	8957.60	2.61	2.61
2	730.99	20.69	0.0	1968.93	1.74	1.74	5263.09	148.99	0.0	14176.29	12.53	12.53
3	732.87	15.36	0.0	1980.59	6.98	6.98	9673.90	202.78	0.0	26143.80	92.16	92.16
4	757.34	17.39	0.0	1936.58	2.93	2.93	9996.85	229.58	0.0	25562.85	38.64	38.64
5	665.54	13.52	0.0	2091.43	7.58	7.58	8785.14	178.50	0.0	27606.86	100.03	100.03
6	178.66	3.55	0.0	2883.77	40.55	40.55	5681.51	113.00	0.0	91703.88	1289.54	1289.54
7	178.66	3.55	0.0	2883.77	40.55	40.55	5681.51	113.00	0.0	91703.88	1289.54	1289.54
8	398.64	6.34	0.0	2530.50	23.91	23.91	10524.21	167.32	0.0	66805.06	631.31	631.31
8	1271.16	19.06	0.0	1124.68	1.66	1.66	47541.18	712.95	0.0	42062.86	62.17	62.17
9	916.69	16.78	0.0	1687.89	2.61	2.61	16133.79	295.25	0.0	29706.80	45.96	45.96
10	818.52	17.40	0.0	1840.42	2.85	2.85	5238.52	111.37	0.0	11778.70	18.25	18.25

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	7.20	1.44	730.99	5263.09	1.053	20.69	148.99	0.030	1.74	12.53	0.0025
6	0.30	31.80	0.16	178.66	5681.51	0.029	3.55	113.00	0.001	40.55	1289.54	0.0064
7	5.00	31.80	2.64	178.66	5681.51	0.472	3.55	113.00	0.009	40.55	1289.54	0.1070
9	6.00	17.60	1.76	916.69	16133.79	1.613	16.78	295.25	0.030	2.61	45.96	0.0046
10	4.00	6.40	0.43	818.52	5238.52	0.351	17.40	111.37	0.007	2.85	18.25	0.0012
TOTAL FOR CYCLE			6.427			3.517			0.077			0.1218
TOTAL FOR CYCLE/LB FUEL						0.547			0.012			0.0190

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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  186    ENGINE TYPE AND MODEL:  O-200-A                    SERIAL NUMBER:   199599-9-AC

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:    809. HRS

     FUEL: AV GAS 80/87            FUEL H/C RATIO:    1.840
OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   80.00   FINISH   80.00

     ATMOSPHERIC PRESSURE:              START   30.03   FINISH   30.03

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                      53.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:



                      CARB.    TEST     ENGINE      MEASURED      MEASURED     CALCULATED
                      HEATER   MODE      RPM        FUEL FLOW     AIR FLOW        F/A
                                                     LB/HR         LB/HR

IDLE-LOW                         1       -0.0          4.70         55.00       0.06640
IDLE/TAXI                        2       -0.0          7.20         88.00       0.06632
RUN UP                           3       -0.0         13.20        164.00       0.06925
RUN UP-LEAN                      4       -0.0         13.20        163.00       0.06572
RUN UP-RICH                      5       -0.0         13.20        174.00       0.06456
TAKE-OFF                         6       -0.0         49.60        548.00       0.08003
CLIMB                            7       -0.0         49.60        548.00       0.08003
DESCENT                          8       -0.0         32.80        332.00       0.07313
DESCENT                ON        8       -0.0         37.40        381.00       0.08217
APPROACH                         9       -0.0         22.00        239.00       0.07478
TAXI                            10       -0.0          6.40         76.00       0.07255


 TEST    EXHAUST    EXHAUST       CO         CO        THC        NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
 MODE     GAS        GAS        (DRY)         2       (DRY)     (DRY)        2         X       (DRY)
          TEMP     PRESSURE   PERCENT V    (DRY)      PPMV      PPMV      (DRY)     (DRY)
        DEGREES F    PSIA                PERCENT V                        PPMV      PPMV

   1     280.00     -0.00        6.00       7.70    6270.00     17.00     -0.00     -0.00     21.00      -0.00       -0.00
   2     426.00     -0.00        5.80       8.20    3428.00     76.00     -0.00     -0.00     13.00      -0.00       -0.00
   3     751.00     -0.00        6.00       8.80    2146.00    115.00     -0.00     -0.00     -0.00      -0.00       -0.00
   4     684.00     -0.00        5.70       8.30    2202.00     92.00     -0.00     -0.00     -0.00      -0.00       -0.00
   5     785.00     -0.00        4.20       9.70    1644.00    170.00     -0.00     -0.00     -0.00      -0.00       -0.00
   6    1188.00     -0.00        9.60       7.40    2202.00    124.00     -0.00     -0.00     -0.00      -0.00       -0.00
   7    1188.00     -0.00        9.60       7.40    2202.00    124.00     -0.00     -0.00      7.00      -0.00       -0.00
   8    1099.00     -0.00        7.80       7.80    1756.00    122.00     -0.00     -0.00      6.00      -0.00       -0.00
   8    1031.00     -0.00       11.30       6.00    2592.00     43.00     -0.00     -0.00     19.00      -0.00       -0.00
   9     908.00     -0.00        9.20       6.60    2369.00     58.00     -0.00     -0.00     11.00      -0.00       -0.00
  10     504.00     -0.00        7.20       8.20    2815.00     63.00     -0.00     -0.00      9.00      -0.00       -0.00


 TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 MODE      CO         HC         NO2        CO2         NO         NOX        CO         HC         NO2        CO2         NO         NOX
         LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
        LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1     846.05      50.64        0.0    1705.99       0.39       0.39    3976.45     237.99        0.0    8018.13       1.85       1.85
   2     816.95      27.65        0.0    1814.76       1.76       1.76    5882.04     199.11        0.0   13066.29      12.66      12.66
   3     807.31      16.54        0.0    1860.41       2.54       2.54   10656.46     218.29        0.0   24557.42      33.55      33.55
   4     809.79      17.92        0.0    1852.73       2.15       2.15   10689.19     236.50        0.0   24456.04      28.34      28.34
   5     603.30      13.52        0.0    2189.23       4.01       4.01    7963.50     178.53        0.0   28897.77      52.94      52.94
   6    1126.25      14.80        0.0    1364.06       2.39       2.39   55862.00     733.85        0.0   67657.38     118.52     118.52
   7    1126.25      14.80        0.0    1364.06       2.39       2.39   55862.00     733.85        0.0   67657.38     118.52     118.52
   8     998.87      12.88        0.0    1569.45       2.57       2.57   32763.03     422.43        0.0   51478.07      84.17      84.17
   8    1300.10      17.08        0.0    1084.64       0.81       0.81   48623.59     638.78        0.0   40565.63      30.39      30.39
   9    1158.96      17.09        0.0    1306.36       1.20       1.20   25497.16     376.02        0.0   28739.97      26.40      26.40
  10     927.57      20.77        0.0    1659.84       1.33       1.33    5936.45     132.93        0.0   10622.97       8.53       8.53


                                                        LTO CYCLE EMISSIONS

 TEST    TIME IN   MEASURED     FUEL        CO          CO          CO         HC         HC          HC          NO         NO          NO
 MODE     MODE     FUEL FLOW    USED       LB/1K       LB/1K     EMISSION     LB/1K      LB/1K     EMISSION     LB/1K      LB/1K     EMISSION
          MIN.      LB/HR       LBS.      LB FUEL      HOURS       LBS.      LB FUEL     HOURS       LBS.      LB FUEL     HOURS       LBS.

   2     12.00       7.20       1.44      816.95     5882.04      1.176      27.65     199.11      0.040       1.76       12.66     0.0025
   6      0.30      49.60       0.25     1126.25    55862.00      0.279      14.80     733.85      0.004       2.39      118.52     0.0006
   7      5.00      49.60       4.12     1126.25    55862.00      4.637      14.80     733.85      0.061       2.39      118.52     0.0098
   9      6.00      22.00       2.20     1158.96    25497.16      2.550      17.09     376.02      0.038       1.20       26.40     0.0026
  10      4.00       6.40       0.43      927.57     5936.45      0.398      20.77     132.93      0.009       1.33        8.53     0.0006

TOTAL FOR CYCLE                 8.434                             9.040                            0.151                             0.0162

TOTAL FOR CYCLE/LB FUEL                                           1.072                            0.018                             0.0019
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ******************************************************************************************

     CAL ID NUMBER   187    ENGINE TYPE AND MODEL:  O-200-A                   SERIAL NUMBER:   199196-8-AA

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:    952. HRS

     FUEL: AV GAS 80/87             FUEL H/C RATIO:    1.840

OPERATIONAL DATA *************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   84.00   FINISH   86.50

     ATMOSPHERIC PRESSURE:              START   29.97   FINISH   29.97

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     50.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:



                    CARB.     TEST      ENGINE       MEASURED       MEASURED       CALCULATED
                    HEATER    MODE       RPM         FUEL FLOW      AIR FLOW          F/A
                                                      LB/HR          LB/HR

IDLE-LOW                        1        -0.0          4.70           47.00         0.06494
IDLE/TAXI                       2        -0.0          8.10           86.00         0.06191
RUN UP                          3        -0.0         13.20          162.00         0.05717
RUN UP-LEAN                     4        -0.0         14.10          175.00         0.05531
RUN UP-RICH                     5        -0.0         14.10          174.00         0.05712
TAKE-OFF                        6        -0.0         49.60          526.00         0.07049
CLIMB                           7        -0.0         49.60          526.00         0.07049
DESCENT                         8        -0.0         33.70          410.00         0.05932
DESCENT              ON         8        -0.0         40.10          412.00         0.07113
APPROACH                        9        -0.0         21.10          234.00         0.06330
TAXI                           10        -0.0          6.40           70.00         0.06551


 TEST    EXHAUST     EXHAUST       CO          CO        THC        NO         NO         NO      ALDEHYDES     SMOKE     PARTICULATES
 MODE      GAS         GAS        (DRY)         2        (DRY)      (DRY)       2          X        (DRY)
          TEMP      PRESSURE   PERCENT V     (DRY)       PPMV       PPMV      (DRY)      (DRY)
        DEGREES F     PSIA                 PERCENT V                          PPMV       PPMV

   1     325.00      -0.00        7.20        5.30   13559.00       4.00      -0.00      -0.00       5.00       -0.00         -0.00
   2     486.00      -0.00        7.50        5.30    4076.00      17.00      -0.00      -0.00      13.00       -0.00         -0.00
   3     695.00      -0.00        5.00        7.10    2080.00     153.00      -0.00      -0.00      -0.00       -0.00         -0.00
   4     661.00      -0.00        4.60        7.10    2080.00      87.00      -0.00      -0.00      -0.00       -0.00         -0.00
   5     706.00      -0.00        4.90        7.20    2024.00     130.00      -0.00      -0.00      -0.00       -0.00         -0.00
   6    1087.00      -0.00        9.00        5.80    2634.00     122.00      -0.00      -0.00      -0.00       -0.00         -0.00
   7    1087.00      -0.00        9.00        5.80    2634.00     122.00      -0.00      -0.00       8.00       -0.00         -0.00
   8    1031.00      -0.00        5.40        7.20    1747.00     305.00      -0.00      -0.00       7.00       -0.00         -0.00
   8    1009.00      -0.00        9.50        5.30    3632.00     137.00      -0.00      -0.00       7.00       -0.00         -0.00
   9     852.00      -0.00        7.40        5.90    2412.00      89.00      -0.00      -0.00       6.00       -0.00         -0.00
  10     460.00      -0.00        7.70        6.00    3169.00      42.00      -0.00      -0.00       9.00       -0.00         -0.00


 TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1     1049.79     113.22       0.0     1214.18       0.10       0.10    4933.98     532.15       0.0     5706.62       0.45       0.45
   2     1147.20      35.71       0.0     1273.77       0.43       0.43    9292.32     289.23       0.0    10317.56       3.46       3.46
   3      820.70      19.55       0.0     1831.10       4.13       4.13   10833.23     258.11       0.0    24170.45      54.45      54.45
   4      780.41      20.21       0.0     1892.60       2.42       2.42   11003.73     284.96       0.0    26685.66      34.18      34.18
   5      804.65      19.04       0.0     1857.73       3.51       3.51   11345.59     268.40       0.0    26194.00      49.44      49.44
   6     1207.04      20.23       0.0     1222.21       2.69       2.69   59869.13    1003.51       0.0    60621.50     133.30     133.30
   7     1207.04      20.23       0.0     1222.21       2.69       2.69   59869.13    1003.51       0.0    60621.50     133.30     133.30
   8      853.97      15.82       0.0     1789.05       7.92       7.92   28778.93     533.24       0.0    60290.89     266.59     266.99
   8     1265.71      27.71       0.0     1109.49       3.00       3.00   50755.00    1111.34       0.0    44490.71     120.23     120.23
   9     1104.02      20.61       0.0     1383.04       2.18       2.18   23294.77     434.86       0.0    29182.14      46.02      46.02
  10     1109.63      26.32       0.0     1358.56       0.99       0.99    7101.64     168.45       0.0     8694.75       6.36       6.36


                                                     LTO CYCLE EMISSIONS

 TEST    TIME IN    MEASURED     FUEL        CO         CO         CO         HC         HC         HC         NO         NO         NO
 MODE     MODE     FUEL FLOW     USED      LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION
          MIN.       LB/HR       LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.

   2      12.00       8.10       1.62     1147.20    9292.32      1.858      35.71     289.23      0.058       0.43       3.46     0.0007
   6       0.30      49.60       0.25     1207.04   59869.13      0.299      20.23    1003.51      0.005       2.69     133.30     0.0007
   7       5.00      49.60       4.12     1207.04   59869.13      4.969      20.23    1003.51      0.083       2.69     133.30     0.0111
   9       6.00      21.10       2.11     1104.02   23294.77      2.329      20.61     434.86      0.043       2.18      46.02     0.0046
  10       4.00       6.40       0.43     1109.63    7101.64      0.476      26.32     168.45      0.011       0.99       6.36     0.0004

TOTAL FOR CYCLE                  8.524                            9.932                            0.201                            0.0175

TOTAL FOR CYCLE/LB FUEL                                           1.165                            0.024                            0.0020
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DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 188 ENGINE TYPE AND MODEL: O-200-A SERIAL NUMBER: 199196-8-AB

RATED HORSEPOWER: 100.

ENGINE TOTAL TIME: 952. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 86.50 FINISH 88.00

ATMOSPHERIC PRESSURE: START 29.97 FINISH 29.97

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 48.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.CC, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	2.20	24.00	0.06232
IDLE/TAXI		2	-0.0	6.40	73.00	0.06259
RUN UP		3	-0.0	13.20	171.00	0.05551
RUN UP-LEAN		4	-0.0	13.20	169.00	0.05466
RUN UP-RICH		5	-0.0	12.40	166.00	0.05376
TAKE-OFF		6	-0.0	49.60	523.00	0.07094
CLIMB		7	-0.0	49.60	523.00	0.07094
DESCENT		8	-0.0	31.80	390.00	0.06010
DESCENT	ON	8	-0.0	41.10	411.00	0.07332
APPROACH		9	-0.0	21.10	234.00	0.06369
TAXI		10	-0.0	4.70	53.00	0.06287

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	291.00	-0.00	5.20	6.20	9553.00	24.00	-0.00	-0.00	20.00	-0.00	-0.00
2	404.00	-0.00	6.70	6.40	3239.00	47.00	-0.00	-0.00	11.00	-0.00	-0.00
3	684.00	-0.00	3.90	7.90	1976.00	430.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	650.00	-0.00	4.10	7.50	1921.00	150.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	695.00	-0.00	3.00	8.50	1537.00	380.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1087.00	-0.00	9.20	5.70	2525.00	122.00	-0.00	-0.00	22.00	-0.00	-0.00
7	1087.00	-0.00	9.20	5.70	2525.00	122.00	-0.00	-0.00	23.00	-0.00	-0.00
8	1043.00	-0.00	5.40	7.40	1537.00	327.00	-0.00	-0.00	26.00	-0.00	-0.00
8	1043.00	-0.00	9.60	5.30	7302.00	229.00	-0.00	-0.00	8.00	-0.00	-0.00
9	863.00	-0.00	7.40	6.00	2306.00	82.00	-0.00	-0.00	-0.00	-0.00	-0.00
10	437.00	-0.00	7.10	6.10	2635.00	43.00	-0.00	-0.00			

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	937.86	82.76	0.0	1473.60	0.60	0.60	2063.30	182.08	0.0	3241.91	1.31	1.31
2	1008.32	27.92	0.0	1513.36	1.16	1.16	6453.24	178.67	0.0	9685.48	7.44	7.44
3	656.71	19.06	0.0	2090.13	11.89	11.89	8668.54	251.54	0.0	27589.68	156.99	156.99
4	702.42	18.85	0.0	2018.88	4.22	4.22	9271.89	248.80	0.0	26649.18	55.72	55.72
5	520.07	15.26	0.0	2315.24	10.82	10.82	6448.82	189.23	0.0	28708.92	134.17	134.17
6	1226.61	19.28	0.0	1194.07	2.67	2.67	60839.69	956.33	0.0	59225.48	132.52	132.52
7	1226.61	19.28	0.0	1194.07	2.67	2.67	60839.69	956.33	0.0	59225.98	132.52	132.52
8	842.17	13.73	0.0	1813.33	8.38	8.38	26781.11	436.57	0.0	57663.98	266.38	266.38
8	1240.82	54.05	0.0	1076.34	4.86	4.86	50997.65	2221.60	0.0	44237.76	199.82	199.82
9	1096.78	19.57	0.0	1397.26	2.00	2.00	23142.00	413.02	0.0	29482.11	42.12	42.12
10	1065.37	22.64	0.0	1438.18	1.06	1.06	5007.25	106.43	0.0	6759.42	4.98	4.98

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	6.40	1.28	1008.32	6453.24	1.291	27.92	179.67	0.036	1.16	7.44	0.0015
6	0.30	49.60	0.25	1226.61	60839.69	0.304	19.28	956.33	0.005	2.67	132.52	0.0007
7	5.00	49.60	4.12	1226.61	60839.69	5.050	19.28	956.33	0.079	2.67	132.52	0.0110
9	6.00	21.10	2.11	1096.78	23142.00	2.314	19.57	413.02	0.041	2.00	42.12	0.0042
10	4.00	4.70	0.31	1065.37	5007.25	0.335	22.64	106.43	0.007	1.06	4.98	0.0003
TOTAL FOR CYCLE			8.070			9.294			0.168			0.0177
TOTAL FOR CYCLE/LB FUEL						1.152			0.021			0.0022

DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 109 ENGINE TYPE AND MODEL: O-200-A SERIAL NUMBER: 199196-8-AC

RATED HORSEPOWER: 100.

ENGINE TOTAL TIME: 953. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 88.50 FINISH 88.50

ATMOSPHERIC PRESSURE: START 29.96 FINISH 29.96

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 46.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	3.00	36.00	0.06601
IDLE/TAXI		2	-0.0	5.60	66.00	0.07127
RUN UP		3	-0.0	13.20	173.00	0.06933
RUN UP-LEAN		4	-0.0	12.40	158.00	0.06776
RUN UP-RICH		5	-0.0	12.40	167.00	0.06629
TAKE-OFF		6	-0.0	48.60	542.00	0.08012
CLIMB		7	-0.0	48.60	542.00	0.08012
DESCENT		8	-0.0	31.80	383.00	0.07298
DESCENT	ON	8	-0.0	39.20	387.00	0.08640
APPROACH		9	-0.0	19.30	214.00	0.07764
TAXI		10	-0.0	5.60	63.00	0.07528

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	240.00	-0.00	5.60	7.90	7576.00	31.00	-0.00	-0.00	29.00	-0.00	-0.00
2	332.00	-0.00	6.90	8.20	3074.00	63.00	-0.00	-0.00	9.00	-0.00	-0.00
3	740.00	-0.00	4.60	10.30	2416.00	392.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	717.00	-0.00	5.10	9.40	2361.00	134.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	740.00	-0.00	3.60	10.70	2086.00	560.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1199.00	-0.00	9.40	7.60	2580.00	210.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1199.00	-0.00	9.40	7.60	2580.00	210.00	-0.00	-0.00	11.00	-0.00	-0.00
8	1121.00	-0.00	7.00	8.60	2031.00	244.00	-0.00	-0.00	10.00	-0.00	-0.00
8	1043.00	-0.00	12.20	5.80	4392.00	71.00	-0.00	-0.00	13.00	-0.00	-0.00
9	934.00	-0.00	9.10	7.30	3019.00	91.00	-0.00	-0.00	10.00	-0.00	-0.00
10	447.00	-0.00	4.20	7.70	3294.00	60.00	-0.00	-0.00	8.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	793.49	61.48	0.0	1758.82	0.72	0.72	2380.48	184.44	0.0	5276.45	2.16	2.16
2	904.74	23.08	0.0	1689.37	1.36	1.36	5066.52	129.27	0.0	9460.46	7.60	7.60
3	613.75	18.46	0.0	2159.26	8.59	8.59	8101.43	243.69	0.0	28502.26	113.40	113.40
4	699.18	18.54	0.0	2024.82	3.02	3.02	8669.84	229.87	0.0	25107.70	37.42	37.42
5	501.29	16.64	0.0	2340.98	12.81	12.81	6215.84	206.28	0.0	29028.20	158.82	158.82
6	1100.37	17.30	0.0	1397.86	4.04	4.04	53478.04	840.64	0.0	67935.88	196.24	196.24
7	1100.37	17.30	0.0	1397.86	4.04	4.04	53478.04	840.64	0.0	67935.88	196.24	196.24
8	894.87	14.87	0.0	1727.41	5.17	5.12	28456.70	472.87	0.0	54931.71	162.93	162.93
8	1336.66	27.56	0.0	998.45	1.28	1.28	52396.86	1080.32	0.0	39139.22	50.09	50.09
9	1100.72	20.91	0.0	1387.39	1.81	1.81	21243.91	403.65	0.0	24776.50	34.89	34.89
10	1020.74	23.48	0.0	1506.01	1.23	1.23	5716.12	131.51	0.0	8433.66	6.87	6.87

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	5.60	1.12	904.74	5066.52	1.013	23.08	129.27	0.026	1.36	7.60	0.0015
6	0.30	48.60	0.24	1100.37	53478.04	0.267	17.30	840.64	0.004	4.04	196.24	0.0010
7	5.00	48.60	4.03	1100.37	53478.04	4.439	17.30	840.64	0.070	4.04	196.24	0.0163
9	6.00	19.30	1.93	1100.72	21243.91	2.124	20.91	403.65	0.040	1.81	34.89	0.0035
10	4.00	5.60	0.38	1020.74	5716.12	0.383	23.48	131.51	0.009	1.23	6.87	0.0005
TOTAL FOR CYCLE			7.702			8.227			0.149			0.0227
TOTAL FOR CYCLE/LB FUEL						1.068			0.019			0.0030

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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  190    ENGINE TYPE AND MODEL:  O-200-A                 SERIAL NUMBER:   204579A

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:     714. HRS

     FUEL: AV GAS 80/87               FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   90.50   FINISH   87.50

     ATMOSPHERIC PRESSURE:              START   29.85   FINISH   29.85

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     50.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:




                     CARB.    TEST     ENGINE      MEASURED      MEASURED      CALCULATED
                     HEATER   MODE      RPM        FUEL FLOW     AIR FLOW         F/A
                                                     LB/HR         LB/HR

IDLE-LOW                        1       -0.0          2.20         24.00        0.07640
IDLE/TAXI                       2       -0.0          7.20         82.00        0.07448
RUN UP                          3       -0.0         19.30        232.00        0.07049
RUN UP-LEAN                     4       -0.0         15.80        190.00        0.06916
RUN UP-RICH                     5       -0.0         16.70        201.00        0.07080
TAKE-OFF                        6       -0.0         49.60        519.00        0.08349
CLIMB                           7       -0.0         49.60        519.00        0.08349
DESCENT                         8       -0.0         34.60        418.00        0.07151
DESCENT              ON         8       -0.0         39.20        416.00        0.08115
APPROACH                        9       -0.0         21.10        233.00        0.07619
TAXI                           10       -0.0          7.20         84.00        0.07687


  TEST   EXHAUST     EXHAUST      CO         CO        THC        NO        NO         NO      ALDEHYDES     SMOKE    PARTICULATES
  MODE     GAS         GAS       (DRY)        2       (DRY)     (DRY)        2          X        (DRY)
          TEMP      PRESSURE   PERCENT V    (DRY)      PPMV      PPMV      (DRY)      (DRY)
        DEGREES F     PSIA                PERCENT V                        PPMV       PPMV

   1     325.00      -0.00        8.20       7.50    7570.00     22.00     -0.00      -0.00      25.00       -0.00        -0.00
   2     426.00      -0.00        9.30       7.40    3355.00     49.00     -0.00      -0.00      20.00       -0.00        -0.00
   3     673.00      -0.00        6.70       8.30    2468.00    190.00     -0.00      -0.00      -0.00       -0.00        -0.00
   4     650.00      -0.00        6.50       8.20    2523.00    115.00     -0.00      -0.00      -0.00       -0.00        -0.00
   5     695.00      -0.00        6.80       8.30    2135.00    125.00     -0.00      -0.00      -0.00       -0.00        -0.00
   6    1076.00      -0.00       11.00       6.60    2911.00     94.00     -0.00      -0.00      -0.00       -0.00        -0.00
   7    1076.00      -0.00       11.00       6.60    2911.00     94.00     -0.00      -0.00      11.00       -0.00        -0.00
   8    1054.00      -0.00        6.80       8.50    1802.00    311.00     -0.00      -0.00      10.00       -0.00        -0.00
   8    1031.00      -0.00       10.40       6.70    3022.00    173.00     -0.00      -0.00      13.00       -0.00        -0.00
   9     841.00      -0.00        9.10       7.00    2690.00    125.00     -0.00      -0.00      15.00       -0.00        -0.00
  10     437.00      -0.00        8.20       8.10    3022.00     75.00     -0.00      -0.00      13.00       -0.00        -0.00


  TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1      1006.62      53.22       0.0     1446.61       0.44       0.44    2214.56     117.09       0.0     3182.54       0.98       0.98
   2      1045.68      24.21       0.0     1464.84       1.01       1.01    7528.87     174.30       0.0    10546.82       7.30       7.30
   3       887.77      18.73       0.0     1727.98       4.14       4.14   17133.85     361.47       0.0    33350.04      79.81      79.81
   4       878.23      19.52       0.0     1740.79       2.55       2.55   13876.00     308.47       0.0    27504.45      40.32      40.32
   5       897.09      16.13       0.0     1720.46       2.71       2.71   14981.41     269.39       0.0    28731.60      45.23      45.23
   6      1242.10      18.83       0.0     1170.97       1.74       1.74   61608.27     933.76       0.0    58080.29      86.48      86.48
   7      1242.10      18.83       0.0     1170.97       1.74       1.74   61608.27     933.76       0.0    58080.29      86.48      86.48
   8       987.43      13.47       0.0     1742.94       6.67       6.67   30705.08     466.02       0.0    60305.72     230.67     230.67
   8      1207.34      20.09       0.0     1222.11       3.30       3.30   47327.88     787.63       0.0    47906.77     129.32     129.32
   9      1123.11      19.01       0.0     1357.43       2.53       2.53   23697.54     401.20       0.0    28641.64      53.47      53.47
  10       997.82      21.06       0.0     1548.67       1.50       1.50    7184.27     151.64       0.0    11150.43      10.79      10.79


                                                   LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED     FUEL        CO         CO         CO         HC         HC         HC         NO         NO         NO
  MODE     MODE    FUEL FLOW     USED      LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION
           MIN.      LB/HR       LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.

   2      12.00       7.20       1.44     1045.68    7528.87     1.506      24.21     174.30      0.035      1.01        7.30     0.0015
   6       0.30      49.60       0.25     1242.10   61608.27     0.308      18.83     933.76      0.005      1.74       86.48     0.0004
   7       5.00      49.60       4.12     1242.10   61608.27     5.113      18.83     933.76      0.078      1.74       86.48     0.0072
   9       6.00      21.10       2.11     1123.11   23697.54     2.370      19.01     401.20      0.040      2.53       53.47     0.0053
  10       4.00       7.20       0.48      997.82    7184.27     0.481      21.06     151.64      0.010      1.50       10.79     0.0007

 TOTAL FOR CYCLE                 8.397                           9.778                            0.167                           0.0151

 TOTAL FOR CYCLE/LB FUEL                                         1.164                            0.020                           0.0018
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  191    ENGINE TYPE AND MODEL:  O-200-A                   SERIAL NUMBER:   2045798

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:    714. HRS

     FUEL: AV GAS 80/87             FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   89.00   FINISH   89.50

     ATMOSPHERIC PRESSURE:              START   29.86   FINISH   29.86

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     50.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  11

 COMMENTS:


                 CARB.    TEST     ENGINE      MEASURED      MEASURED      CALCULATED
                 HEATER   MODE      RPM        FUEL FLOW     AIR FLOW         F/A
                                                LB/HR         LB/HR

IDLE-LOW                   1        -0.0         5.60         63.00         0.07338
IDLE/TAXI                  2        -0.0         8.10         94.00         0.07415
RUN UP                     3        -0.0        15.00        188.00         0.06834
RUN UP-LEAN                4        -0.0        15.00        183.00         0.06770
RUN UP-RICH                5        -0.0        14.10        183.00         0.06791
TAKE-OFF                   6        -0.0        49.60        515.00         0.08402
CLIMB                      7        -0.0        49.60        515.00         0.08402
DESCENT                    8        -0.0        34.60        416.00         0.07206
DESCENT          ON        8        -0.0        41.10        429.00         0.08367
APPROACH                   9        -0.0        21.10        231.00         0.07726
TAXI                      10        -0.0         7.20         83.00         0.07647


  TEST   EXHAUST     EXHAUST      CO          CO        THC       NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS         GAS       (DRY)         2       (DRY)     (DRY)       2         X        (DRY)
          TEMP      PRESSURE   PERCENT V    (DRY)      PPMV      PPMV     (DRY)     (DRY)
        DEGREES F     PSIA                PERCENT V                         PPMV      PPMV

    1    303.00      -0.00        7.40       7.80    6313.00     60.00    -0.00     -0.00      23.00      -0.00       -0.00
    2    437.00      -0.00        7.60       8.10    3184.00     82.0     -0.00     -0.00      14.00      -0.00       -0.00
    3    684.00      -0.00        5.50       9.10    2416.00    270.0     -0.00     -0.00      -0.00      -0.00       -0.00
    4    650.00      -0.00        6.00       8.40    2525.00    180.00    -0.00     -0.00      -0.00      -0.00       -0.00
    5    695.00      -0.00        4.80       9.80    1976.00    280.00    -0.00     -0.00      -0.00      -0.00       -0.00
    6   1076.00      -0.00       11.20       6.50    2965.00     89.00    -0.00     -0.00      -0.00      -0.00       -0.00
    7   1076.00      -0.00       11.20       6.50    2965.00     89.00    -0.00     -0.00      11.00      -0.00       -0.00
    8   1054.00      -0.00        6.90       8.50    1976.00    342.00    -0.00     -0.00      10.00      -0.00       -0.00
    8   1043.00      -0.00       11.00       6.60    3294.00    199.00    -0.00     -0.00      11.00      -0.00       -0.00
    9    830.00      -0.00        9.30       7.00    2965.00    129.00    -0.00     -0.00       9.00      -0.00       -0.00
   10    493.00      -0.00        8.20       8.00    3074.00     83.00    -0.00     -0.00      12.00      -0.00       -0.00


  TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
           LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
          LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    1     944.32     46.14      0.0     1563.93     0.84      0.84    5288.16    258.38     0.0     8758.02     4.70      4.70
    2     958.31     23.00      0.0     1605.11     1.70      1.70    7763.92    186.29     0.0    13001.42    13.76     13.76
    3     748.66     18.83      0.0     1946.26     6.04      6.04   11229.88    282.52     0.0    29193.89    90.55     90.55
    4     827.26     19.94      0.0     1819.73     4.08      4.08   12408.88    299.08     0.0    27295.99    61.15     61.15
    5     655.32     15.45      0.0     2102.20     6.28      6.28    9234.97    217.85     0.0    29641.07    88.53     88.53
    6    1257.28     19.06      0.0     1146.48     1.64      1.64   62361.04    945.51     0.0    56865.26    81.40     81.40
    7    1257.28     19.06      0.0     1146.48     1.64      1.64   62361.04    945.51     0.0    56865.26    81.40     81.40
    8     893.70     14.66      0.0     1729.82     7.28      7.28   30922.10    507.17     0.0    59851.82   251.75    251.75
    8    1239.45     21.26      0.0     1168.47     3.68      3.68   50941.34    873.67     0.0    48024.20   151.37    151.37
    9    1132.06     20.67      0.0     1338.82     2.58      2.58   23886.38    436.15     0.0    28249.05    54.42     54.42
   10    1003.55     21.55      0.0     1538.34     1.67      1.67    7225.52    155.13     0.0    11076.02    12.01     12.01


                                                  LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL       CO        CO         CO        HC        HC        HC         NO        NO        NO
  MODE     MODE    FUEL FLOW    USED      LB/1K     LB/1K    EMISSION    LB/1K     LB/1K   EMISSION    LB/1K     LB/1K   EMISSION
           MIN.      LB/HR      LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS     LBS.     LB FUEL    HOURS      LBS.

    2     12.00      8.10      1.62      958.51    7763.92    1.553      23.00    186.29     0.037      1.70     13.76    0.0028
    6      0.30     49.60      0.25     1257.28   62361.04    0.312      19.06    945.51     0.005      1.64     81.40    0.0004
    7      5.00     49.60      4.12     1257.28   62361.04    5.176      19.06    945.51     0.078      1.64     81.40    0.0068
    9      6.00     21.10      2.11     1132.06   23885.38    2.389      20.67    436.15     0.044      2.58     54.42    0.0054
   10      4.00      7.20      0.48     1003.55    7225.52    0.484      21.55    155.13     0.010      1.67     12.01    0.0008

 TOTAL FOR CYCLE               8.577                        9.913                          0.174                        0.0162

 TOTAL FOR CYCLE/LB FUEL                                    1.156                          0.020                        0.0019
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DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 192 ENGINE TYPE AND MODEL: O-200-A SERIAL NUMBER: 204579C

RATED HORSEPOWER: 100.

ENGINE TOTAL TIME: 715. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 89.50 FINISH 89.00

ATMOSPHERIC PRESSURE: START 29.86 FINISH 29.86

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 50.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	3.00	35.00	0.07255
IDLE/TAXI		2	-0.0	6.40	72.00	0.07718
RUN UP		3	-0.0	13.20	165.00	0.07200
RUN UP-LEAN		4	-0.0	13.20	162.00	0.07177
RUN UP-RICH		5	-0.0	13.20	172.00	0.06884
TAKE-OFF		6	-0.0	48.60	543.00	0.08097
CLIMB		7	-0.0	48.60	543.00	0.08097
DESCENT		8	-0.0	34.60	406.00	0.07554
DESCENT	ON	8	-0.0	41.10	411.00	0.08659
APPROACH		9	-0.0	22.00	236.00	0.08111
TAXI		10	-0.0	5.60	60.00	0.08172

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	314.00	-0.00	6.70	8.00	9717.00	32.00	-0.00	-0.00	30.00	-0.00	-0.00
2	426.00	-0.00	8.40	7.80	4447.00	63.00	-0.00	-0.00	17.00	-0.00	-0.00
3	740.00	-0.00	6.00	9.40	2525.00	370.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	673.00	-0.00	6.30	9.00	2745.00	172.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	751.00	-0.00	4.70	10.10	2196.00	340.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1188.00	-0.00	9.50	7.70	2470.00	137.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1188.00	-0.00	9.50	7.70	2470.00	137.00	-0.00	-0.00	9.00	-0.00	-0.00
8	1143.00	-0.00	7.80	8.30	2306.00	254.00	-0.00	-0.00	6.00	-0.00	-0.00
8	1065.00	-0.00	12.00	6.10	4063.00	99.00	-0.00	-0.00	9.00	-0.00	-0.00
9	942.00	-0.00	10.10	7.00	3184.00	103.00	-0.00	-0.00	11.00	-0.00	-0.00
10	538.00	-0.00	9.70	7.40	4831.00	54.00	-0.00	-0.00	9.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	863.70	71.74	0.0	1620.37	0.68	0.68	2591.08	215.22	0.0	4861.11	2.03	2.03
2	1019.54	30.91	0.0	1487.51	1.26	1.26	6525.07	197.84	0.0	9520.04	8.04	8.04
3	774.41	18.66	0.0	1906.27	7.84	7.84	10222.17	246.38	0.0	25162.73	103.54	103.54
4	817.20	20.39	0.0	1834.29	3.66	3.66	10787.04	269.18	0.0	24212.64	48.37	48.37
5	632.18	16.92	0.0	2134.53	7.51	7.51	8344.78	223.30	0.0	28175.82	99.16	99.16
6	1100.03	16.38	0.0	1400.91	2.61	2.61	53461.47	796.08	0.0	68084.13	126.64	126.64
7	1100.03	16.38	0.0	1400.91	2.61	2.61	53461.47	796.08	0.0	68084.13	126.64	126.64
8	964.93	16.34	0.0	1613.30	5.16	5.16	33386.44	565.30	0.0	55820.25	178.58	178.58
8	1309.98	25.40	0.0	1046.29	1.78	1.78	53840.00	1044.04	0.0	43002.33	72.96	72.96
9	1171.43	21.15	0.0	1275.64	1.96	1.96	25771.38	465.30	0.0	28064.18	43.17	43.17
10	1114.50	31.79	0.0	1335.91	1.02	1.02	6241.17	178.02	0.0	7481.07	5.71	5.71

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	6.40	1.28	1019.54	6525.07	1.305	30.91	197.84	0.040	1.26	8.04	0.0016
6	0.30	48.60	0.24	1100.03	53461.47	0.267	16.38	796.08	0.004	2.61	126.64	0.0006
7	5.00	48.60	4.03	1100.03	53461.47	4.437	16.38	796.08	0.066	2.61	126.64	0.0105
9	6.00	22.00	2.20	1171.43	25771.38	2.577	21.15	465.30	0.047	1.96	43.17	0.0043
10	4.00	5.60	0.38	1114.50	6241.17	0.418	31.79	178.02	0.012	1.02	5.71	0.0004
TOTAL FOR CYCLE			8.132			9.005			0.168			0.0175
TOTAL FOR CYCLE/LB FUEL						1.107			0.021			0.0021

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DATE:   7/28/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA **********************************************************************************************

     CAL ID NUMBER:  229    ENGINE TYPE AND MODEL:  O-320-A2B            SERIAL NUMBER:   26664 A

                            RATED HORSEPOWER:   150.

     ENGINE TOTAL TIME:    257. HRS

     FUEL: AV GAS 80/87               FUEL H/C RATIO:    1.840

OPERATIONAL DATA *****************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   84.50   FINISH   86.50

     ATMOSPHERIC PRESSURE:              START   30.32   FINISH   30.32

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     40.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:   9

COMMENTS:



                       CARB.    TEST      ENGINE       MEASURED       MEASURED       CALCULATED
                       HEATER   MODE       RPM         FUEL FLOW      AIR FLOW          F/A
                                                         LB/HR          LB/HR

IDLE-LOW                          1         -0.0           6.40          78.00         0.07642
IDLE/TAXI                         2         -0.0           8.10         102.00         0.07425
RUN UP                            3         -0.0          -0.00          -0.00         0.08137
TAKE-OFF                          6         -0.0          70.30         734.00         0.08856
CLIMB                             7         -0.0          70.30         734.00         0.08856
DESCENT                           8         -0.0          39.20         459.00         0.08004
DESCENT                 ON        8         -0.0          41.10         401.00         0.09196
APPROACH                          9         -0.0          19.30         220.00         0.07832
TAXI                             10         -0.0          16.70         215.00         0.07296


  TEST   EXHAUST    EXHAUST       CO         CO        THC        NO        NO        NO      ALDEHYDES    SMOKE     PARTICULATES
  MODE     GAS        GAS        (DRY)        2        (DRY)     (DRY)       2         X        (DRY)
          TEMP     PRESSURE   PERCENT V    (DRY)       PPMV      PPMV      (DRY)     (DRY)
        DEGREES F    PSIA                PERCENT V                         PPMV      PPMV

   1     673.00     -0.00        6.70       9.40    5100.00     24.00     -0.00     -0.00     17.00      -0.00         -0.00
   2     706.00     -0.00        5.90      10.00    2852.00     42.00     -0.00     -0.00     14.00      -0.00         -0.00
   3     998.00     -0.00        9.60       7.60    3256.00     36.00     -0.00     -0.00     -0.00      -0.00         -0.00
   6    1412.00     -0.00       11.60       6.90    4984.00     73.00     -0.00     -0.00     -0.00      -0.00         -0.00
   7    1412.00     -0.00       11.60       6.90    4984.00     73.00     -0.00     -0.00     21.00      -0.00         -0.00
   8    1323.00     -0.00        8.30       8.80    2391.00    101.00     -0.00     -0.00     10.00      -0.00         -0.00
   8    1233.00     -0.00       13.20       5.80    6195.00     20.00     -0.00     -0.00     13.00      -0.00         -0.00
   9    1031.00     -0.00        8.70       7.90    2968.00     66.00     -0.00     -0.00     11.00      -0.00         -0.00
  10     807.00     -0.00        5.20      10.50    2449.00     55.00     -0.00     -0.00     12.00      -0.00         -0.00


  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUFL   LB FUEL   LB FUEL

   1     814.91     35.53      0.0     1796.38     0.48      0.48   5215.39    227.37      0.0   11496.93      3.07      3.07
   2     736.44     20.39      0.0     1961.20     0.86      0.86   5965.14    165.14      0.0   15885.73      6.97      6.97
   3    1106.62     21.50      0.0     1376.51     0.68      0.68     -0.00     -0.00      0.0      -0.00     -0.00     -0.00
   6    1233.51     30.35      0.0     1152.85     1.28      1.28  86715.75   2133.85      0.0   81045.19     89.64     89.64
   7    1233.51     30.35      0.0     1152.85     1.28      1.28  86715.75   2133.85      0.0   81045.19     89.64     89.64
   8     967.06     15.96      0.0     1611.00     1.93      1.93  37908.73    625.44      0.0   63151.27     75.77     75.77
   8    1359.22     36.53      0.0      938.38     0.34      0.34  55863.74   1501.56      0.0   38567.58     13.90     13.90
   9    1040.20     20.32      0.0     1484.10     1.30      1.30  20075.84    392.25      0.0   28643.07     25.02     25.02
  10     658.85     17.77      0.0     2090.30     1.14      1.14  11002.71    296.78      0.0   34907.91     19.12     19.12


                                                  LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL       CO         CO         CO        HC        HC         HC        NO        NO         NO
  MODE     MODE    FUEL FLOW    USED      LB/1K      LB/1K    EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION
           MIN.      LB/HR      LBS.     LB FUEL     HOURS      LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.

   2      12.00      8.10      1.62      736.44    5965.14     1.193      20.39    165.14     0.033      0.86      6.97    0.0014
   6       0.30     70.30      0.35     1233.51   86715.75     0.434      30.35   2133.85     0.011      1.28     89.64    0.0004
   7       5.00     70.30      5.83     1233.51   86715.75     7.197      30.35   2133.85     0.177      1.28     89.64    0.0074
   9       6.00     19.30      1.93     1040.20   20075.84     2.008      20.32    392.25     0.039      1.30     25.02    0.0025
  10       4.00     16.70      1.12      658.85   11002.71     0.737      17.77    296.78     0.020      1.14     19.12    0.0013

TOTAL FOR CYCLE                10.855                          11.569                        0.280                         0.0131

TOTAL FOR CYCLE/LB FUEL                                         1.066                        0.026                         0.0012
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DATE:   7/30/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ******************************************************************************************

     CAL ID NUMBER:  230     ENGINE TYPE AND MODEL:  O-320-A2B               SERIAL NUMBER:   26664 B

                             RATED HORSEPOWER:   150.

     ENGINE TOTAL TIME:    257. HRS

     FUEL: AV GAS 80/87               FUEL H/C RATIO:    1.840
OPERATIONAL DATA *************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   84.50   FINISH   84.00

     ATMOSPHERIC PRESSURE:              START   30.32   FINISH   30.32

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     42.0C  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:   9

COMMENTS:



                   CARB.     TEST      ENGINE       MEASURED       MEASURED      CALCULATED
                   HEATER    MODE       RPM         FUEL FLOW      AIR FLOW         F/A
                                                     LB/HR          LB/HR

IDLE-LOW                      1         -0.0        10.60          141.00         0.07113
IDLE/TAXI                     2         -0.0         8.10          106.00         0.07244
RUN UP                        3         -0.0        30.90          338.00         0.08717
TAKE-OFF                      6         -0.0        69.30          676.00         0.09173
CLIMB                         7         -0.0        69.30          676.00         0.09173
DESCENT                       8         -0.0        40.10          476.00         0.07817
DESCENT             ON        8         -0.0        41.10          403.00         0.09016
APPROACH                      9         -0.0        21.10          238.00         0.C7899
TAXI                         10         -0.0         5.60           73.00         0.07100


 TEST   EXHAUST    EXHAUST      CO         CO        THC        NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
 MODE     GAS        GAS       (DRY)        2       (DRY)      (DRY)       2         X       (DRY)
          TEMP     PRESSURE  PERCENT V    (DRY)      PPMV       PPMV     (DRY)     (DRY)
       DEGREES F     PSIA               PERCENT V                         PPMV      PPMV

  1     617.00      -0.00       4.20      11.00    3841.00     34.00     -C.00     -0.00     16.00      -0.00       -0.00
  2     751.00      -0.00       4.70      10.90    2619.00     57.00     -0.00     -0.00     12.00      -0.00       -0.00
  3     953.00      -0.00      10.60       7.80    3841.00     43.00     -0.00     -0.00     -0.00      -0.00       -0.00
  6    1412.00      -0.00      11.60       6.70   13619.00     42.00     -0.00     -0.00     34.00      -0.00       -0.00
  7    1412.00      -0.00      11.60       6.70   13619.00     42.00     -0.00     -0.00     34.00      -0.00       -0.00
  8    1368.00      -0.00       7.80       8.90    2444.00    104.00     -0.00     -0.00     10.00      -0.00       -0.00
  8    1222.00      -0.00      12.90       5.70    6286.00     22.00     -0.00     -0.00      6.00      -0.00       -0.00
  9    1054.00      -0.00       8.90       7.80    3317.00     65.00     -0.00     -0.00      8.00      -0.00       -C.00
 10     785.00      -0.00       4.30      11.00    2561.00     57.00     -C.00     -0.00     10.00      -0.00       -0.00


 TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 MODE      CO         HC        NO2        CO2         NO        NOX         CO         HC        NO2        CO2         NO        NOX
         LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
        LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

  1     544.46      28.52       0.0      2240.53      0.72       0.72     5771.32     302.28      0.0     23749.62      7.67       7.67
  2     598.61      19.10       0.0      2191.28      1.19       1.19     4848.75     154.74      0.0     17668.36      9.66       9.66
  3    1140.03      23.66       0.0      1318.09      0.76       0.76    35227.02     731.07      0.0     40728.91     23.47      23.47
  6    1191.89      80.14       0.0      1081.66      0.71       0.71    82597.56    5553.92      0.0     74958.75     49.12      49.12
  7    1191.89      80.14       0.0      1081.66      0.71       0.71    82597.56    5553.92      0.0     74958.75     49.12      49.12
  8     929.97      16.69       0.0      1667.26      2.04       2.04    37291.90     669.22      0.0     66857.19     81.67      81.67
  8    1355.33      37.82       0.0       940.95      0.38       0.39    55703.92    1554.59      0.0     38673.11     15.60      15.60
  9    1055.68      22.53       0.0      1453.71      1.27       1.27    22274.91     475.46      0.0     30673.17     26.72      26.72
 10     558.43      19.05       0.0      2244.56      1.22       1.22     3127.21     106.67      0.0     12569.55      6.81       6.81


                                               LTO CYCLE EMISSIONS

 TEST   TIME IN    MEASURED     FUEL       CO         CO         CO         HC         HC         HC         NO         NO         NO
 MODE    MODE     FUEL FLOW     USED      LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION
         MIN.       LB/HR       LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.

  2     12.00        8.10       1.62      598.61    4849.75      C.970      19.10     154.74      0.031      1.19       9.66     0.0019
  6      0.30       69.30       0.35     1191.89   82597.56      0.413      80.14    5553.92      0.028      0.71      49.12     0.0002
  7      5.00       69.30       5.75     1191.89   82597.56      6.856      80.14    5553.92      0.461      0.71      49.12     0.0041
  9      6.00       21.10       2.11     1055.68   22274.31      2.227      22.53     475.46      0.048      1.27      26.72     0.0027
 10      4.00        5.60       0.38      558.43    3127.21      0.210      19.05     106.67      0.007      1.22       6.81     0.0005

 TOTAL FOR CYCLE                10.204                          10.675                           0.574                          0.0094

 TOTAL FOR CYCLE/LB FUEL                                         1.046                           0.056                          0.0009
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DATE:    7/30/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  231    ENGINE TYPE AND MODEL:  O-320-A2B              SERIAL NUMBER:    26664C

                            RATED HORSEPOWER:    150.

     ENGINE TOTAL TIME:    258. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   85.50   FINISH   84.00

     ATMOSPHERIC PRESSURE:              START   3C.32   FINISH   30.28

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                      41.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.0C,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:   9

COMMENTS:



                   CARB.    TEST      ENGINE       MEASURED      MEASURED      CALCULATED
                   HEATER   MODE       RPM         FUEL FLOW     AIR FLOW         F/A
                                                     LB/HR         LB/HR

IDLE-LOW                      1        -0.0           5.60         75.00       0.06745
IDLE/TAXI                     2        -0.0           7.20         97.00       0.06951
RUN UP                        3        -0.0          30.90        331.00       0.08243
TAKE-OFF                      6        -0.0          69.30        724.00       0.08833
CLIMB                         7        -0.0          69.30        724.00       0.08833
DESCENT                       8        -0.0          41.10        481.00       0.07875
DESCENT             ON        8        -0.0          40.10        392.00       0.09092
APPROACH                      9        -0.0          19.30        221.00       0.07930
TAXI                         10        -0.0           8.10        106.00       0.07152


  TEST   EXHAUST    EXHAUST      CO          CO        THC        NO         NO         NO      ALDEHYDES     SMOKE     PARTICULATES
  MODE     GAS        GAS       (DRY)         2       (DRY)      (DRY)        2          X        (DRY)
          TEMP     PRESSURE   PERCENT V     (DRY)     PPMV       PPMV       (DRY)      (DRY)
        DEGREES F    PSIA               PERCENT V                           PPMV       PPMV

    1    583.00     -0.00        3.10      11.20    4976.00     37.00     -C.00      -0.00       15.00       -0.00          -0.00
    2    706.00     -0.00        3.70      11.30    2532.00     57.00     -0.00      -0.00        9.00       -0.00          -0.00
    3   1076.00     -0.00       10.40       6.90    3928.00     51.00     -0.00      -0.00       -0.00       -0.00          -0.00
    6   1390.00     -0.00       11.40       6.80    7420.00     29.00     -C.00      -0.00       21.00       -0.00          -0.00
    7   1390.00     -0.00       11.40       6.80    7420.00     29.00     -0.00      -0.00       21.00       -0.00          -0.00
    8   1345.00     -0.00        8.10       8.70    2532.00     88.00     -0.00      -0.00        6.00       -0.00          -0.00
    8   1211.00     -0.00       13.00       5.70    6897.00     20.00     -0.00      -0.00       -0.00       -0.00          -0.00
    9   1009.00     -0.00        9.70       8.10    3230.00     70.00     -0.00      -0.00        6.00       -0.00          -0.00
   10    785.00     -0.00        4.60      10.80    2532.00     53.00     -C.00      -0.00        7.00       -0.00          -0.00


  TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
           LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
          LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    1     423.23     38.91      0.0     2402.52     0.83      0.83    237C.06    217.88      0.0   13454.10      4.65      4.65
    2     490.05     19.21      0.0     2351.57     1.24      1.24    3528.38    138.29      0.0   16931.27      8.93      8.93
    3    1187.51     25.69      3.0     1237.92     0.96      0.96   36694.17    793.74      0.0   38251.71     29.56     29.56
    6    1215.85     45.32      0.0     1139.52     0.51      0.51   84258.44   3140.93      0.0   78968.81     35.21     35.21
    7    1215.85     45.32      0.0     1139.52     0.51      0.51   84258.44   3140.93      0.0   78968.81     35.21     35.21
    8     959.58     17.18      0.0     1619.40     1.71      1.71   39438.70    706.07      0.0   66557.19     70.38     70.38
    8    1354.48     41.16      0.0      933.13     0.34      0.34   54314.82   1650.36      0.0   37418.64     13.73     13.73
    9    1026.46     21.83      0.0     1501.57     1.36      1.36   19810.62    421.24      0.0   28980.25     26.18     26.18
   10     593.69     18.72      0.0     2190.08     1.12      1.12    4808.85    151.60      0.0   17739.67      9.10      9.10


                                                     LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL       CO        CO         CO        HC        HC         HC        NO        NO         NO
  MODE     MODE    FUEL FLOW    USED      LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION
           MIN.      LB/HR      LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.

    2     12.00      7.20       1.44     490.05    3528.38    C.706      19.21     138.29     0.028      1.24       8.93    0.0018
    6      0.30     69.30       0.35    1215.85   84258.44    0.421      45.32    3140.93     0.016      0.51      35.21    0.0002
    7      5.00     69.30       5.75    1215.85   84258.44    6.993      45.32    3140.93     0.261      0.51      35.21    C.0029
    9      6.00     19.30       1.93    1026.46   19810.62    1.981      21.83     421.24     0.042      1.36      26.18    0.0026
   10      4.00      8.10       0.54     593.69    4808.85    0.322      18.72     151.60     0.010      1.12       9.1C    0.0006

 TOTAL FOR CYCLE               10.011                         10.424                         0.356                         0.0081

 TOTAL FOR CYCLE/LB FUEL                                       1.041                         0.036                         0.0008
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DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 384 ENGINE TYPE AND MODEL: O-320-B3B SERIAL NUMBER: L-4393-39

RATED HORSEPOWER: 160.

ENGINE TOTAL TIME: 563. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 84.00 FINISH 77.00

ATMOSPHERIC PRESSURE: START 29.80 FINISH 29.80

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 78.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	15.20	176.00	0.02233
IDLE/TAXI		2	-0.0	19.90	247.00	0.02358
RUN UP		3	-0.0	32.80	479.00	0.03164
RUN UP-LEAN		4	-0.0	16.40	246.00	0.02402
RUN UP-RICH		5	-0.0	30.50	431.00	0.02706
TAKE-OFF		6	-0.0	50.40	541.00	0.06197
CLIMB		7	-0.0	45.70	548.00	0.06581
DESCENT		8	-0.0	42.20	502.00	0.06492
DESCENT	ON	8	-0.0	42.20	432.00	0.06675
APPROACH		9	-0.0	36.30	385.00	0.05234
TAXI		10	-0.0	17.60	233.00	0.02136

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	168.00	-0.00	1.70	2.60	4168.00	0.0	-0.00	-0.00	5.00	-0.00	-0.00
2	191.00	-0.00	1.70	3.10	1924.00	0.0	-0.00	-0.00	4.00	-0.00	-0.00
3	426.00	-0.00	0.50	6.20	962.00	0.0	-0.00	-0.00	-0.00	-0.00	-0.00
4	426.00	-0.00	0.10	5.00	321.00	0.0	-0.00	-0.00	-0.00	-0.00	-0.00
5	415.00	-0.00	0.60	5.00	1817.00	0.0	-0.00	-0.00	-0.00	-0.00	-0.00
6	830.00	-0.00	7.60	5.30	3206.00	0.0	-0.00	-0.00	-0.00	-0.00	-0.00
7	740.00	-0.00	6.20	7.70	2992.00	0.0	-0.00	-0.00	6.00	-0.00	-0.00
8	695.00	-0.00	6.20	7.50	2939.00	0.0	-0.00	-0.00	8.00	-0.00	-0.00
8	594.00	-0.00	8.90	4.90	4061.00	0.0	-0.00	-0.00	10.00	-0.00	-0.00
9	516.00	-0.00	6.50	4.30	3206.00	0.0	-0.00	-0.00	6.00	-0.00	-0.00
10	269.00	-0.00	0.90	3.40	2298.00	0.0	-0.00	-0.00	4.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	728.12	102.24	0.0	1749.71	0.0	0.0	11067.43	1554.07	0.0	26595.58	0.0	0.0
2	687.93	44.59	0.0	1971.03	0.0	0.0	13689.71	887.35	0.0	39223.42	0.0	0.0
3	148.63	16.38	0.0	2895.78	0.0	0.0	4875.05	537.19	0.0	94981.56	0.0	0.0
4	39.36	7.24	0.0	3092.54	0.0	0.0	645.58	118.69	0.0	50717.61	0.0	0.0
5	209.65	36.36	0.0	2745.08	0.0	0.0	6394.36	1109.04	0.0	83724.88	0.0	0.0
6	1161.35	28.06	0.0	1272.52	0.0	0.0	58532.20	1414.13	0.0	64135.02	0.0	0.0
7	882.12	24.38	0.0	1721.34	0.0	0.0	40313.06	1114.19	0.0	78665.25	0.0	0.0
8	895.07	24.30	0.0	1701.23	0.0	0.0	37771.74	1025.46	0.0	71791.81	0.0	0.0
8	1265.66	33.08	0.0	1094.87	0.0	0.0	53410.84	1395.78	0.0	46203.38	0.0	0.0
9	1180.83	33.36	0.0	1227.38	0.0	0.0	42864.07	1210.84	0.0	44554.00	0.0	0.0
10	401.39	58.70	0.0	2382.54	0.0	0.0	7064.44	1033.07	0.0	41932.66	0.0	0.0

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	19.90	3.98	687.93	13689.71	2.738	44.59	887.35	0.177	0.0	0.0	0.0
6	0.30	50.40	0.25	1161.35	59532.20	0.293	28.06	1414.13	0.007	0.0	0.0	0.0
7	5.00	45.70	3.79	882.12	40313.06	3.346	24.38	1114.19	0.092	0.0	0.0	0.0
9	6.00	36.30	3.63	1180.83	42864.07	4.286	33.36	1210.84	0.121	0.0	0.0	0.0
10	4.00	17.60	1.18	401.39	7064.44	0.473	58.70	1033.07	0.069	0.0	0.0	0.0
TOTAL FOR CYCLE			12.834			11.136			0.467			0.0
TOTAL FOR CYCLE/LB FUEL						0.868			0.036			0.0

DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 385   ENGINE TYPE AND MODEL: O-320-B3B   SERIAL NUMBER: L-4393-39A

RATED HORSEPOWER: 160.

ENGINE TOTAL TIME: 563. HRS

FUEL: AV GAS 100/130   FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 76.50 FINISH 72.00

ATMOSPHERIC PRESSURE: START 29.80 FINISH 29.80

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 94.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	16.40	197.00	0.04672
IDLE/TAXI		2	-0.0	19.90	261.00	0.05921
RUN UP		3	-0.0	32.80	370.00	0.07631
RUN UP-LEAN		4	-0.0	15.20	172.00	0.07351
RUN UP-RICH		5	-0.0	31.60	356.00	0.07325
TAKE-OFF		6	-0.0	50.40	544.00	0.08588
CLIMB		7	-0.0	45.70	524.00	0.08286
DESCENT		8	-0.0	44.50	535.00	0.08018
DESCENT	ON	8	-0.0	43.40	444.00	0.09169
APPROACH		9	-0.0	36.30	414.00	0.08238
TAXI		10	-0.0	18.80	250.00	0.02565

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	381.00	-0.00	2.60	6.40	10368.00	0.0	-0.00	-0.00	15.00	-0.00	-0.00
2	549.00	-0.00	3.50	9.00	3615.00	0.0	-0.00	-0.00	4.00	-0.00	-0.00
3	863.00	-0.00	8.60	7.50	3350.00	0.0	-0.00	-0.00	-0.00	-0.00	-0.00
4	942.00	-0.00	8.20	7.30	3190.00	0.0	-0.00	-0.00	-0.00	-0.00	-0.00
5	863.00	-0.00	8.20	7.20	3562.00	0.0	-0.00	-0.00	-0.00	-0.00	-0.00
6	1177.00	-0.00	10.70	7.40	3722.00	0.0	-0.00	-0.00	-0.00	-0.00	-0.00
7	1289.00	-0.00	9.00	8.60	3296.00	0.0	-0.00	-0.00	6.00	-0.00	-0.00
8	1300.00	-0.00	7.60	9.50	3296.00	0.0	-0.00	-0.00	5.00	-0.00	-0.00
8	1121.00	-0.00	12.50	6.70	4466.00	0.0	-0.00	-0.00	17.00	-0.00	-0.00
9	1087.00	-0.00	9.10	8.40	3084.00	0.0	-0.00	-0.00	8.00	-0.00	-0.00
10	549.00	-0.00	2.80	2.30	3084.00	0.0	-0.00	-0.00	5.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	523.34	119.52	0.0	2024.07	0.0	0.0	8582.69	1960.16	0.0	33194.67	0.0	0.0
2	549.77	32.52	0.0	2221.22	0.0	0.0	10940.34	647.17	0.0	44202.19	0.0	0.0
3	1057.14	23.58	0.0	1448.54	0.0	0.0	34674.02	773.56	0.0	47512.19	0.0	0.0
4	1047.22	23.33	0.0	1464.82	0.0	0.0	15917.69	354.65	0.0	22265.24	0.0	0.0
5	1051.39	26.16	0.0	1450.51	0.0	0.0	33223.94	826.56	0.0	45836.15	0.0	0.0
6	1170.22	23.31	0.0	1271.61	0.0	0.0	58978.99	1174.99	0.0	64089.00	0.0	0.0
7	1014.08	21.27	0.0	1522.54	0.0	0.0	46343.61	972.03	0.0	69579.94	0.0	0.0
8	880.90	21.88	0.0	1730.12	0.0	0.0	39200.18	973.66	0.0	76990.31	0.0	0.0
8	1285.36	26.30	0.0	1082.50	0.0	0.0	55784.61	1141.48	0.0	46980.50	0.0	0.0
9	1032.33	20.04	0.0	1497.25	0.0	0.0	37473.54	727.35	0.0	54350.17	0.0	0.0
10	1045.90	65.98	0.0	1349.89	0.0	0.0	19662.95	1240.37	0.0	25377.96	0.0	0.0

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	19.90	3.98	549.77	10940.34	2.188	32.52	647.17	0.129	0.0	0.0	0.0
6	0.30	50.40	0.25	1170.22	58978.99	0.295	23.31	1174.99	0.006	0.0	0.0	0.0
7	5.00	45.70	3.79	1014.08	46343.61	3.847	21.27	972.03	0.081	0.0	0.0	0.0
9	6.00	36.30	3.63	1032.33	37473.54	3.747	20.04	727.35	0.073	0.0	0.0	0.0
10	4.00	18.80	1.26	1045.90	19662.95	1.317	65.98	1240.37	0.083	0.0	0.0	0.0
TOTAL FOR CYCLE			12.915			11.394			0.372			0.0
TOTAL FOR CYCLE/LB FUEL						0.882			0.029			0.0

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DATE:   8/17/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  356    ENGINE TYPE AND MODEL:  O-320-B3B              SERIAL NUMBER:   L-4393-39B

                            RATED HORSEPOWER:   160.

     ENGINE TOTAL TIME:    563. HRS

     FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840

OPERATIONAL DATA *************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   66.00   FINISH   68.00

     ATMOSPHERIC PRESSURE:              START   29.97   FINISH   29.97

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     51.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  11

 COMMENTS:



                    CARB.    TEST     ENGINE      MEASURED      MEASURED      CALCULATED
                   HEATER    MODE      RPM        FUEL FLOW     AIR FLOW         F/A
                                                    LB/HR         LB/HR

IDLE-LOW                      1        -0.0         14.10        149.00        0.07271
IDLE/TAXI                     2        -0.0         19.90        222.00        0.08455
RUN UP                        3        -0.0         38.70        449.00        0.07494
RUN UP-LEAN                   4        -0.0         21.10        247.00        0.07390
RUN UP-RICH                   5        -0.0         38.70        453.00        0.07297
TAKE-OFF                      6        -0.0         73.80        905.00        0.07411
CLIMB                         7        -0.0         59.80        770.00        0.07345
DESCENT                       8        -0.0         55.10        697.00        0.07496
DESCENT             ON        8        -0.0         56.30        580.00        0.08864
APPROACH                      9        -0.0         43.40        500.00        0.08120
TAXI                         10        -0.0         19.90        246.00        0.07067


  TEST   EXHAUST    FXHAUST      CO         CO        THC        NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS        GAS       (DRY)        2       (DRY)      (DRY)       2         X       (DRY)
          TEMP     PRESSURE   PERCENT V   (DRY)      PPMV       PPMV     (DRY)     (DRY)
        DEGREES F    PSIA               PERCENT V                         PPMV      PPMV

   1     330.00     -0.00        7.50       6.90  12244.00     18.00     -0.00     -0.00      7.00      -0.00        -0.00
   2     527.00     -0.00        9.70       8.00   5424.00     48.00     -0.00     -0.00      3.00      -0.00        -0.00
   3     807.00     -0.00        7.90       8.00   2792.00    137.00     -0.00     -0.00     -0.00      -0.00        -0.00
   4     852.00     -0.00        7.60       8.10   2631.00    101.00     -0.00     -0.00     -0.00      -0.00        -0.00
   5     807.00     -0.00        7.50       8.00   2578.00    106.00     -0.00     -0.00     -0.00      -0.00        -0.00
   6    1278.00     -0.00        6.50       9.30   3007.00    411.00     -0.00     -0.00     -0.00      -0.00        -0.00
   7    1300.00     -0.00        5.20      10.60   2578.00    944.00     -0.00     -0.00     -0.00      -0.00        -0.00
   8    1278.00     -0.00        5.80      10.30   2631.00    737.00     -0.00     -0.00      3.00      -0.00        -0.00
   8    1076.00     -0.00       11.90       6.70   3974.00    175.00     -0.00     -0.00      3.00      -0.00        -0.00
   9    1076.00     -0.00        8.80       8.50   2631.00    296.00     -0.00     -0.00      2.00      -0.00        -0.00
  10     482.00     -0.00        5.90       9.10   3437.00    100.00     -0.00     -0.00      3.00      -0.00        -0.00


  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K      LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1      969.75    90.67      0.0     1401.80     0.38      0.38   13673.47   1278.46     0.0   19765.35      5.39      5.39
   2     1074.22    34.40      0.0     1392.03     0.87      0.87   21376.88    684.60     0.0   27701.35     17.38     17.38
   3      986.44    19.97      0.0     1569.54     2.81      2.81   38175.32    772.71     0.0   60741.27     108.74    108.74
   4      961.83    19.07      0.0     1610.67     2.10      2.10   20294.60    402.38     0.0   33985.21      44.30     44.30
   5      961.54    18.93      0.0     1611.52     2.23      2.23   37211.61    732.56     0.0   62365.63      86.39     86.39
   6      815.59    21.61      0.0     1833.49     8.47      8.47   60190.32   1594.75     0.0  135311.44     625.14    625.14
   7      654.21    18.58      0.0     2095.37    19.51     19.51   39121.91   1110.82     0.0  125302.81    1166.57   1166.57
   8      716.08    18.60      0.0     1998.08    14.95     14.95   39456.23   1025.07     0.0  110093.88     823.52    823.52
   8     1265.48    24.20      0.0     1119.49     3.06      3.06   71246.38   1362.67     0.0   63027.39     172.10    172.10
   9     1012.24    17.33      0.0     1536.24     5.59      5.59   43931.20    752.24     0.0   66672.56     242.72    242.72
  10      776.83    25.92      0.0     1882.57     2.16      2.16   15458.83    515.76     0.0   37463.13      43.04     43.04


                                              LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL      CO         CO         CO         HC        HC         HC        NO        NO         NO
  MODE     MODE     FUEL FLOW   USED     LB/1K      LB/1K    EMISSION    LB/1K     LB/1K    EMISSION   LB/1K     LB/1K    EMISSION
           MIN.      LB/HR      LBS.    LB FUEL     HOURS      LBS.     LB FUEL    HOURS      LBS.    LB FUEL    HOURS      LBS.

   2      12.00      19.90      3.98    1074.22   21376.88     4.275     34.40     684.60     0.137     0.87      17.38    0.0035
   6       0.30      73.80      0.37     815.59   60190.32     0.301     21.61    1594.75     0.008     8.47     625.14    0.0031
   7       5.00      59.80      4.96     654.21   39121.91     3.247     18.58    1110.82     0.092    19.51    1166.57    0.0968
   9       6.00      43.40      4.34    1012.24   43931.20     4.393     17.33     752.24     0.075     5.59     242.72    0.0243
  10       4.00      19.90      1.33     776.83   15458.83     1.036     25.92     515.76     0.035     2.16      43.04    0.0029

 TOTAL FOR CYCLE               14.986                         13.252                          0.347                          0.1306

 TOTAL FOR CYCLE/LB FUEL                                       0.884                          0.023                          0.0087
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3893

DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 387 ENGINE TYPE AND MODEL: O-320-B3B SERIAL NUMBER: L-4336-39

RATED HORSEPOWER: 160.

ENGINE TOTAL TIME: 433. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 70.00 FINISH 72.00

ATMOSPHERIC PRESSURE: START 29.97 FINISH 29.97

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 44.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.80

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	10.50	101.00	0.08209
IDLE/TAXI		2	-0.0	15.20	164.00	0.08546
RUN UP		3	-0.0	21.10	23.50	0.07892
RUN UP-LEAN		4	-0.0	18.80	210.00	0.07834
RUN UP-RICH		5	-0.0	19.90	223.00	0.07854
TAKE-OFF		6	-0.0	79.70	958.00	0.08184
CLIMB		7	-0.0	68.00	974.00	0.06807
DESCENT		8	-0.0	51.60	658.00	0.07579
DESCENT	ON	8	-0.0	53.90	566.00	0.08793
APPROACH		9	-0.0	35.20	408.00	0.08080
TAXI		10	-0.0	16.40	182.00	0.07945

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURF PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	404.00	-0.00	10.00	5.90	16435.00	79.00	-0.00	-0.00	10.00	-0.00	-0.00
2	493.00	-0.00	10.50	7.30	5750.00	29.00	-0.00	-0.00	7.00	-0.00	-0.00
3	863.00	-0.00	9.20	7.50	2929.00	89.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	908.00	-0.00	9.00	7.60	2766.00	70.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	886.00	-0.00	9.00	7.60	3200.00	69.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1267.00	-0.00	7.40	9.70	7068.00	529.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1379.00	-0.00	1.70	13.10	2658.00	2846.00	-0.00	-0.00	11.00	-0.00	-0.00
8	1267.00	-0.00	5.70	10.60	2658.00	724.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1121.00	-0.00	11.50	7.00	3743.00	141.00	-0.00	-0.00	4.00	-0.00	-0.00
9	1087.00	-0.00	9.60	8.60	2875.00	208.00	-0.00	-0.00	4.00	-0.00	-0.00
10	482.00	-0.00	9.20	7.40	4990.00	53.00	-0.00	-0.00	2.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	1151.56	108.39	0.0	1067.52	1.49	1.49	12091.35	1138.12	0.0	11208.96	15.69	15.69
2	1154.42	36.21	0.0	1261.06	0.52	0.52	17547.18	550.34	0.0	19168.09	7.96	7.96
3	1093.76	19.94	0.0	1400.99	1.74	1.74	23078.32	420.81	0.0	29560.77	36.67	36.67
4	1077.36	18.96	0.0	1429.45	1.38	1.38	20254.29	356.51	0.0	26873.63	25.88	25.88
5	1074.59	21.88	0.0	1425.78	1.35	1.35	21384.38	435.46	0.0	28373.06	26.93	26.93
6	839.55	45.93	0.0	1729.12	9.86	9.86	66912.25	3660.29	0.0	137811.13	785.69	785.69
7	227.96	20.41	0.0	2760.06	62.69	62.69	15501.26	1388.09	0.0	187684.25	4262.59	4262.59
8	695.13	18.56	0.0	2031.11	14.50	14.50	35868.54	957.94	0.0	104805.25	748.34	748.34
8	1230.92	22.95	0.0	1177.25	2.48	2.48	66346.38	1236.76	0.0	63453.54	133.62	133.62
9	993.51	19.02	0.0	1561.03	3.95	3.95	34971.57	669.58	0.0	54948.18	138.93	138.93
10	1086.97	33.77	0.0	1373.73	1.03	1.03	17826.35	553.76	0.0	22529.13	16.87	16.87

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODF MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	15.20	3.04	1154.42	17547.18	3.509	36.21	550.34	0.110	0.52	7.96	0.0016
6	0.30	79.70	0.40	839.55	66912.25	0.335	45.93	3660.29	0.018	9.86	785.69	0.0039
7	5.00	68.00	5.64	227.96	15501.26	1.287	20.41	1388.09	0.115	62.69	4262.59	0.3538
9	6.00	35.20	3.52	993.51	34971.57	3.497	19.02	669.58	0.067	3.95	138.93	0.0139
10	4.00	16.40	1.10	1086.97	17826.35	1.194	33.77	553.76	0.037	1.03	16.87	0.0011
TOTAL FOR CYCLE			13.701			9.822			0.348			0.3743
TOTAL FOR CYCLE/LB FUEL						0.717			0.025			0.0273

DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 388 ENGINE TYPE AND MODEL: O-320-B3B SERIAL NUMBER: L-4336-39A

RATED HORSEPOWER: 160.

ENGINE TOTAL TIME: 433. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 75.00 FINISH 77.50

ATMOSPHERIC PRESSURE: START 29.70 FINISH 29.70

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 36.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	12.90	123.00	0.07957
IDLE/TAXI		2	-0.0	18.80	209.00	0.08165
RUN UP		3	-0.0	24.60	276.00	0.07662
RUN UP-LEAN		4	-0.0	21.10	235.00	0.07663
RUN UP-RICH		5	-0.0	21.10	238.00	0.07560
TAKE-OFF		6	-0.0	68.00	828.00	0.07890
CLIMB		7	-0.0	56.30	752.00	0.07351
DESCENT		8	-0.0	50.40	641.00	0.07620
DESCENT	ON	8	-0.0	51.60	535.00	0.08898
APPROACH		9	-0.0	34.00	388.00	0.08201
TAXI		10	-0.0	17.60	198.00	0.08008

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	426.00	-0.00	9.60	5.70	16924.00	7.00	-0.00	-0.00	13.00	-0.00	-0.00
2	504.00	-0.00	9.40	7.70	4936.00	42.00	-0.00	-0.00	9.00	-0.00	-0.00
3	874.00	-0.00	8.80	7.40	2929.00	96.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	919.00	-0.00	8.90	7.30	2875.00	72.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	874.00	-0.00	8.50	7.50	2821.00	73.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1345.00	-0.00	7.10	9.70	3688.00	509.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1356.00	-0.00	4.20	11.70	2549.00	1115.00	-0.00	-0.00	8.00	-0.00	-0.00
8	1323.00	-0.00	5.80	10.60	2549.00	654.00	-0.00	-0.00	8.00	-0.00	-0.00
8	1155.00	-0.00	11.90	6.80	3797.00	109.00	-0.00	-0.00	6.00	-0.00	-0.00
9	1121.00	-0.00	9.00	8.40	3309.00	204.00	-0.00	-0.00	5.00	-0.00	-0.00
10	5.38	-0.00	9.00	7.80	4665.00	62.00	-0.00	-0.00	6.00	-0.00	-0.00

0897

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	1141.35	115.24	0.0	1064.78	0.14	0.14	14723.39	1486.57	0.0	13735.68	1.76	1.76
2	1079.38	32.46	0.0	1389.24	0.79	0.79	20292.36	610.27	0.0	26117.63	14.89	14.89
3	1077.92	20.55	0.0	1424.21	1.93	1.93	26516.88	505.48	0.0	35035.58	47.52	47.52
4	1090.53	20.18	0.0	1405.43	1.45	1.45	23010.13	425.71	0.0	29654.48	30.58	30.58
5	1054.66	20.05	0.0	1462.15	1.49	1.49	22253.20	422.98	0.0	30851.27	31.39	31.39
6	835.45	24.85	0.0	1793.38	9.84	9.84	56810.52	1690.08	0.0	121949.63	668.97	668.97
7	525.23	18.26	0.0	2298.91	22.90	22.90	29570.25	1027.83	0.0	129428.50	1289.44	1289.44
8	703.54	17.71	0.0	2020.24	13.03	13.03	35458.33	892.49	0.0	101820.25	656.73	656.73
8	1260.02	23.03	0.0	1131.30	1.90	1.90	65017.04	1188.14	0.0	58375.07	97.82	97.82
9	1025.45	21.59	0.0	1503.79	3.82	3.82	34865.23	734.16	0.0	51129.01	129.81	129.81
10	1053.03	31.26	0.0	1433.94	1.19	1.19	18533.28	550.18	0.0	25237.27	20.97	20.97

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	18.80	3.76	1079.38	20292.36	4.058	32.46	610.27	0.122	0.79	14.89	0.0030
6	0.30	68.00	0.34	835.45	56810.52	0.284	24.85	1690.08	0.008	9.84	668.97	0.0033
7	5.00	56.30	4.67	525.23	29570.25	2.454	18.26	1027.83	0.085	22.90	1289.44	0.1070
9	6.00	34.00	3.40	1025.45	34865.23	3.487	21.59	734.16	0.073	3.82	129.81	0.0130
10	4.00	17.60	1.18	1053.03	18533.28	1.242	31.26	550.18	0.037	1.19	20.97	0.0014
TOTAL FOR CYCLE			13.352			11.525			0.326			0.1277
TOTAL FOR CYCLE/LB FUEL						0.863			0.024			0.0096

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DATE:   8/17/71
TEST ORGANIZATION:  SCOTT/GEN AVIATION
ENGINE SUPPLIER:  LYCOMING
ENGINE DATA ***********************************************************************************************
    CAL ID NUMBER:  389    ENGINE TYPE AND MODEL:  O-320-B3B               SERIAL NUMBER:   L-4336-39
                           RATED HORSEPOWER:   160.
    ENGINE TOTAL TIME:    433. HRS
    FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840
OPERATIONAL DATA ******************************************************************************************
    INLET AIR TEMPERATURE, DEGREES F:  START   77.50   FINISH   79.00
    ATMOSPHERIC PRESSURE:              START   29.70   FINISH   29.70
    INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01
    RELATIVE HUMIDITY:                    34.00  PERCENT
    SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00
    SAMPLE LINE TRANSPORT TIME, SEC:    1.60
NUMBER OF TESTS:  11
COMMENTS:



                    CARB.    TEST     ENGINE      MEASURED      MEASURED      CALCULATED
                   HEATER    MODE      RPM       FUEL FLOW      AIR FLOW         F/A
                                                   LB/HR          LB/HR

IDLE-LOW                       1       -0.0        15.20         165.00        0.07257
IDLE/TAXI                      2       -0.0        16.40         211.00        0.07319
RUN UP                         3       -0.0        24.60         249.00        0.07937
RUN UP-LEAN                    4       -0.0        21.10         230.00        0.07878
RUN UP-RICH                    5       -0.0        22.30         250.00        0.07774
TAKE-OFF                       6       -0.0        72.70         767.00        0.08870
CLIMB                          7       -0.0        55.10         566.00        0.08972
DESCENT                        8       -0.0        49.20         522.00        0.08737
DESCENT                        8       -0.0        52.70         500.00        0.09559
APPROACH                       9       -0.0        38.70         406.00        0.08790
TAXI                          10       -0.0        17.60         201.00        0.07719


 TEST   EXHAUST    EXHAUST      CO        CO        THC       NO       NO       NO     ALDEHYDES   SMOKE   PARTICULATES
 MODE     GAS        GAS       (DRY)       2       (DRY)     (DRY)      2        X      (DRY)
         TEMP     PRESSURE  PERCENT V   (DRY)      PPMV      PPMV    (DRY)    (DRY)
       DEGREES F    PSIA               PERCENT V                     PPMV     PPMV

   1    471.00     -0.00       6.70      7.50   14410.00    38.00    -0.00    -0.00     9.00     -0.00      -0.00
   2    583.00     -0.00       5.10     10.50    3940.00   113.00    -0.00    -0.00     6.00     -0.00      -0.00
   3    962.00     -0.00       9.60      7.10    3562.00   101.00    -0.00    -0.00    -0.00     -0.00      -0.00
   4    975.00     -0.00       9.50      7.10    3292.00    73.00    -0.00    -0.00    -0.00     -0.00      -0.00
   5    964.00     -0.00       8.90      7.50    3400.00    86.00    -0.00    -0.00    -0.00     -0.00      -0.00
   6   1199.00     -0.00      11.30      7.10    6476.00   112.00    -0.00    -0.00    -0.00     -0.00      -0.00
   7   1211.00     -0.00      12.10      6.60    5181.00    76.00    -0.00    -0.00     7.00     -0.00      -0.00
   8   1222.00     -0.00      11.20      7.10    4641.00   110.00    -0.00    -0.00     6.00     -0.00      -0.00
   8   1143.00     -0.00      14.30      5.40    6476.00    45.00    -0.00    -0.00     6.00     -0.00      -0.00
   9   1099.00     -0.00      11.50      7.00    3670.00    86.00    -0.00    -0.00     5.00     -0.00      -0.00
  10    605.00     -0.00       8.20      7.90    5559.00    57.00    -0.00    -0.00     6.00     -0.00      -0.00


 TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE      CO        HC       NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO        NOX
         LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
        LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1    865.39    106.60      0.0    1522.08      0.81      0.81   13153.93   1620.28      0.0    23135.57    12.25     12.25
   2    644.19     28.50      0.0    2083.88      2.34      2.34   10564.73    467.44      0.0    34175.57    38.45     38.45
   3   1137.08     24.16      0.0    1321.34      1.96      1.96   27972.14    594.42      0.0    32505.06    48.34     48.34
   4   1133.69     22.50      0.0    1331.26      1.43      1.43   23920.55    474.74      0.0    28089.49    30.19     30.19
   5   1074.08     23.50      0.0    1422.15      1.70      1.70   23951.95    524.05      0.0    31713.94    38.02     38.02
   6   1198.51     39.34      0.0    1183.20      1.95      1.95   87131.25   2859.88      0.0    86018.56   141.85    141.85
   7   1271.97     31.19      0.0    1090.12      1.31      1.31   70085.50   1718.71      0.0    60065.55    72.31     72.31
   8   1205.85     28.62      0.0    1201.08      1.95      1.95   59327.66   1407.98      0.0    59093.00    95.71     95.71
   8   1419.79     36.82      0.0     842.41      0.73      0.73   74823.00   1940.67      0.0    44394.73    38.68     38.68
   9   1231.39     22.51      0.0    1177.70      1.51      1.51   47654.91    871.01      0.0    45577.04    58.54     58.54
  10    994.60     38.62      0.0    1505.56      1.14      1.14   17504.91    679.65      0.0    26497.89    19.99     19.99


                                                  LTO CYCLE EMISSIONS

 TEST    TIME IN   MEASURED    FUEL       CO         CO         CO        HC        HC         HC        NO        NO         NO
 MODE     MODE    FUEL FLOW    USED     LB/1K      LB/1K    EMISSION   LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION
          MIN.      LB/HR      LBS.    LB FUEL     HOURS      LBS.    LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.

   2     12.00      16.40      3.28    644.19   10564.73     2.113     28.50    467.44     0.093      2.34      38.45    0.0077
   6      0.30      72.70      0.36   1198.51   87131.25     0.436     39.34   2859.88     0.014      1.95     141.85    0.0007
   7      5.00      55.10      4.57   1271.97   70085.50     5.817     31.19   1718.71     0.143      1.31      72.31    0.0060
   9      6.00      38.70      3.87   1231.39   47654.91     4.765     22.51    871.01     0.087      1.51      58.54    0.0059
  10      4.00      17.60      1.18    994.60   17504.91     1.173     38.62    679.65     0.046      1.14      19.99    0.0013

 TOTAL FOR CYCLE              13.266                        14.304                         0.383                          0.0216

 TOTAL FOR CYCLE/LB FUEL                                     1.078                         0.029                          0.0016
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DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 232 ENGINE TYPE AND MODEL: O-320-E2A SERIAL NUMBER: L-26201-27AA

RATED HURSEPOWER: 150.

ENGINE TOTAL TIME: 1394. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 81.00 FINISH 81.00

ATMOSPHERIC PRESSURE: START 30.05 FINISH 30.05

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 48.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	5.90	72.00	0.03326
IDLE/TAXI		2	-0.0	5.90	64.00	0.05254
RUN UP		3	-0.0	25.80	298.00	0.07922
RUN UP-LEAN		4	-0.0	23.40	275.00	0.07594
RUN UP-RICH		5	-0.0	25.80	300.00	0.07767
TAKE-OFF		6	-0.0	64.50	734.00	0.08251
CLIMB		7	-0.0	66.80	761.00	0.08251
DESCENT		8	-0.0	29.30	358.00	0.07628
DESCENT	ON	8	-0.0	41.00	413.00	0.08787
APPROACH		9	-0.0	11.70	141.00	0.07562
TAXI		10	-0.0	34.00	443.00	0.04145

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO2 (DRY) PPMV	NOX (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	303.00	-0.00	2.70	4.20	1734.00	25.00	-0.00	-0.00	11.00	-0.00	-0.00
2	426.00	-0.00	6.10	4.80	2889.00	27.00	-0.00	-0.00	15.00	-0.00	-0.00
3	874.00	-0.00	8.50	8.40	2312.00	113.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	785.00	-0.00	7.80	8.40	2254.00	96.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	942.00	-0.00	8.20	8.40	1965.00	88.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1211.00	-0.00	9.20	8.40	2369.00	247.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1211.00	-0.00	9.20	8.40	2369.00	247.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1143.00	-0.00	6.90	9.50	1849.00	384.00	-0.00	-0.00	4.00	-0.00	-0.00
8	1043.00	-0.00	17.20	6.10	4797.00	132.00	-0.00	-0.00	-0.00	-0.00	-0.00
9	852.00	-0.00	7.30	8.90	1965.00	187.00	-0.00	-0.00	10.00	-0.00	-0.00
10	415.00	-0.00	2.70	6.10	925.00	93.00	-0.00	-0.00	10.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	771.15	28.36	0.0	1884.78	1.17	1.17	4549.77	167.35	0.0	11120.22	6.92	6.92
2	1101.40	29.87	0.0	1361.74	0.80	0.80	6498.25	176.26	0.0	8034.26	4.72	4.72
3	1002.38	15.62	0.0	1556.44	2.19	2.19	25861.43	402.87	0.0	40156.05	56.47	56.47
4	959.36	15.88	0.0	1623.32	1.94	1.94	22448.94	371.54	0.0	37985.63	45.38	45.38
5	986.27	13.54	0.0	1587.45	1.74	1.74	25445.80	349.23	0.0	40956.25	44.85	44.85
6	1042.01	15.37	0.0	1494.86	4.60	4.60	67209.38	991.18	0.0	96418.25	296.39	296.39
7	1042.01	15.37	0.0	1494.86	4.60	4.60	69605.94	1026.52	0.0	99856.38	306.96	306.96
8	840.50	12.90	0.0	1818.24	7.68	7.68	24626.66	377.95	0.0	53274.37	225.12	225.12
8	1312.42	29.55	0.0	1031.05	2.33	2.33	53809.28	1211.75	0.0	42273.24	95.63	95.63
9	899.44	13.87	0.0	1722.97	3.78	3.78	10523.48	162.23	0.0	20158.80	44.28	44.28
10	613.40	12.04	0.0	2177.44	3.47	3.47	20855.48	409.21	0.0	74032.94	117.99	117.99

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	5.90	1.18	1101.40	6498.25	1.300	29.87	176.26	0.035	0.80	4.72	0.0009
6	0.30	64.50	0.32	1042.01	67209.38	0.336	15.37	991.18	0.005	4.60	296.39	0.0015
7	5.00	66.80	5.54	1042.01	69605.94	5.777	15.37	1026.52	0.085	4.60	306.96	0.0255
9	6.00	11.70	1.17	899.44	10523.48	1.052	13.87	162.23	0.016	3.78	44.28	0.0044
10	4.00	34.00	2.28	613.40	20855.48	1.397	12.04	409.21	0.027	3.47	117.99	0.0079
TOTAL FOR CYCLE			10.495			9.863			0.169			0.0402
TOTAL FOR CYCLE/LB FUEL						0.940			0.016			0.0038

DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 233 ENGINE TYPE AND MODEL: O-320-E2A SERIAL NUMBER: L-26201-27AB

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 1394. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 81.00 FINISH 81.00

ATMOSPHERIC PRESSURE: START 30.05 FINISH 30.05

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 48.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	9.40	125.00	0.04048
IDLE/TAXI		2	-0.0	11.70	143.00	0.06398
RUN UP		3	-0.0	29.30	335.00	0.07887
RUN UP-LEAN		4	-0.0	29.30	331.00	0.07952
RUN UP-RICH		5	-0.0	29.30	336.00	0.08061
TAKE-OFF		6	-0.0	64.50	725.00	0.08079
CLIMB		7	-0.0	64.50	725.00	0.08079
DESCENT		8	-0.0	41.00	495.00	0.07639
DESCENT	ON	8	-0.0	56.30	550.00	0.09014
APPROACH		9	-0.0	17.60	208.00	0.07713
TAXI		10	-0.0	11.70	153.00	0.05468

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	291.00	-0.00	2.10	6.40	1971.00	56.00	-0.00	-0.00	9.00	-0.00	-0.00
2	448.00	-0.00	5.70	7.90	2196.00	93.00	-0.00	-0.00	10.00	-0.00	-0.00
3	897.00	-0.00	8.70	8.10	2309.00	172.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	841.00	-0.00	9.00	7.90	2534.00	101.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	919.00	-0.00	8.90	8.30	2196.00	115.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1233.00	-0.00	9.30	7.90	2252.00	415.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1233.00	-0.00	9.30	7.90	2252.00	415.00	-0.00	-0.00	10.00	-0.00	-0.00
8	1143.00	-0.00	7.20	9.20	1858.00	659.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1054.00	-0.00	13.00	5.70	5237.00	111.00	-0.00	-0.00	12.00	-0.00	-0.00
9	874.00	-0.00	7.70	8.80	2140.00	304.00	-0.00	-0.00	10.00	-0.00	-0.00
10	448.00	-0.00	3.60	8.10	1295.00	126.00	-0.00	-0.00	9.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	487.81	26.22	0.0	2335.85	2.14	2.14	4585.37	246.48	0.0	21957.00	20.08	20.08
2	833.26	18.39	0.0	1814.56	2.23	2.23	9749.15	215.11	0.0	21230.36	26.13	26.13
3	1032.01	15.69	0.0	1509.69	3.35	3.35	30237.85	459.62	0.0	44233.87	98.19	98.19
4	1059.97	17.09	0.0	1461.90	1.95	1.95	31057.14	500.81	0.0	42833.55	57.25	57.25
5	1032.18	14.59	0.0	1512.45	2.19	2.19	30242.73	427.37	0.0	44314.65	64.19	64.19
6	1078.22	14.95	0.0	1439.09	7.90	7.90	69545.06	964.49	0.0	92821.56	509.74	509.74
7	1078.22	14.95	0.0	1439.09	7.90	7.90	69545.06	964.49	0.0	92821.56	509.74	509.74
8	877.00	12.96	0.0	1760.72	13.18	13.18	35956.86	531.42	0.0	72189.69	540.57	540.57
8	1366.18	31.52	0.0	941.19	1.92	1.92	76916.00	1774.60	0.0	52989.10	107.87	107.87
9	930.71	14.81	0.0	1671.25	6.04	6.04	16380.40	260.73	0.0	29414.05	106.23	106.23
10	614.81	12.67	0.0	2173.50	3.53	3.53	7193.22	148.20	0.0	25429.88	41.35	41.35

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	11.70	2.34	833.26	9749.15	1.950	18.39	215.11	0.043	2.23	26.13	0.0052
6	0.30	64.50	0.32	1078.22	69545.06	0.348	14.95	964.49	0.005	7.90	509.74	0.0025
7	5.00	64.50	5.35	1078.22	69545.06	5.772	14.95	964.49	0.080	7.90	509.74	0.0423
9	6.00	17.60	1.76	930.71	16380.40	1.638	14.81	260.73	0.026	6.04	106.23	0.0106
10	4.00	11.70	0.78	614.81	7193.22	0.482	12.67	148.20	0.010	3.53	41.35	0.0028
TOTAL FOR CYCLE			10.560			10.190			0.164			0.0635
TOTAL FOR CYCLE/LB FUEL						0.965			0.016			0.0060

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DATE:   7/28/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA *******************************************************************************************

   CAL ID NUMBER:  234    ENGINE TYPE AND MODEL:  O-320-E2A              SERIAL NUMBER:   L-26201-27AC

                          RATED HORSEPOWER:   150.

   ENGINE TOTAL TIME:   1394. HRS

   FUEL: AV GAS 80/87             FUEL H/C RATIO:    1.840

OPERATIONAL DATA **************************************************************************************

   INLET AIR TEMPERATURE, DEGREES F:  START   84.50   FINISH   84.50

   ATMOSPHERIC PRESSURE:              START   30.05   FINISH   30.05

   INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

   RELATIVE HUMIDITY:                     44.00  PERCENT

   SAMPLE LINE:  TEMPERATURE, DEGREES C:  -0.00,  FLOW RATE, LITERS/MIN:    7.00

   SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:



                    CARB.    TEST     ENGINE     MEASURED      MEASURED     CALCULATED
                    HEATER   MODE      RPM       FUEL FLOW     AIR FLOW        F/A
                                                   LB/HR         LB/HR

IDLE-LOW                       1       -0.0        9.40         128.00        0.03891
IDLE/TAXI                      2       -0.0       10.50         135.00        0.05528
RUN UP                         3       -0.0       27.00         304.00        0.07396
RUN UP-LEAN                    4       -0.0       27.00         306.00        0.07438
RUN UP-RICH                    5       -0.0       28.10         321.00        0.07424
TAKE-OFF                       6       -0.0       66.80         746.00        0.07809
CLIMB                          7       -0.0       66.80         746.00        0.07809
DESCENT                        8       -0.0       37.50         453.00        0.07324
DESCENT              ON        8       -0.0       50.40         493.00        0.08313
APPROACH                       9       -0.0       17.60         208.00        0.07037
TAXI                          10       -0.0       10.50         139.00        0.04961


  TEST   EXHAUST    EXHAUST      CO         CO        THC :      NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS        GAS       (DRY)        2        (DRY)     (DRY)       2         X       (DRY)
          TEMP     PRESSURE   PERCENT V    (DRY)      PPMV      PPMV.     (DRY)     (DRY)
        DEGREES F    PSIA               PERCENT V                          PPMV      PPMV

   1     314.00     -0.00       1.70       6.50    1641.00     -0.00     -0.00     -0.00      7.00      -0.00        -0.00
   2     415.00     -0.00       4.00       7.80    1415.00     -0.00     -0.00     -0.00      6.00      -0.00        -0.00
   3     942.00     -0.00       8.40       7.30    2151.00     -0.00     -0.00     -0.00     -0.00      -0.00        -0.00
   4     874.00     -0.00       8.30       7.50    2207.00     -0.00     -0.00     -0.00     -0.00      -0.00        -0.00
   5     986.00     -0.00       8.20       7.60    1981.00     -0.00     -0.00     -0.00     -0.00      -0.00        -0.00
   6    1222.00     -0.00       9.10       7.50    2151.00     -0.00     -0.00     -0.00     -0.00      -0.00        -0.00
   7    1222.00     -0.00       9.10       7.50    2151.00     -0.00     -0.00     -0.00      9.00      -0.00        -0.00
   8    1143.00     -0.00       6.90       8.80    1755.00     -0.00     -0.00     -0.00      7.00      -0.00        -0.00
   8    1043.00     -0.00      11.90       5.30    5037.00     -0.00     -0.00     -0.00     10.00      -0.00        -0.00
   9     852.00     -0.00       7.00       8.00    1981.00     -0.00     -0.00     -0.00      8.00      -0.00        -0.00
  10     448.00     -0.00       3.10       7.50    1075.00     -0.00     -0.00     -0.00      9.00      -0.00        -0.00


  TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
           LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
          LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1      410.61     22.70      0.0     2466.80    -0.00     -0.00   3859.75    213.39      0.0   23187.94    -0.00     -0.00
   2      676.71     13.71      0.0     2073.36    -0.00     -0.00   7105.46    143.96      0.0   21770.32    -0.00     -0.00
   3     1066.28     15.64      0.0     1455.97    -0.00     -0.00  28789.59    422.22      0.0   39311.28    -0.00     -0.00
   4     1046.64     15.94      0.0     1486.00    -0.00     -0.00  28259.35    430.36      0.0   40122.08    -0.00     -0.00
   5     1035.49     14.33      0.0     1507.94    -0.00     -0.00  29097.35    402.60      0.0   42373.21    -0.00     -0.00
   6     1093.31     14.80      0.0     1415.80    -0.00     -0.00  73033.06    988.70      0.0   94575.38    -0.00     -0.00
   7     1093.31     14.80      0.0     1415.80    -0.00     -0.00  73033.06    988.70      0.0   94575.38    -0.00     -0.00
   8      878.06     12.79      0.0     1759.53    -0.00     -0.00  32927.20    479.65      0.0   65982.13    -0.00     -0.00
   8     1357.95     32.92      0.0      950.28    -0.00     -0.00  68440.81   1659.15      0.0   47894.15    -0.00     -0.00
   9      930.49     15.08      0.0     1670.86    -0.00     -0.00  16376.57    265.43      0.0   29407.16    -0.00     -0.00
  10      584.89     11.62      0.0     2223.38    -0.00     -0.00   6141.36    121.97      0.0   23345.46    -0.00     -0.00


                                                LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED     FUEL       CO        CO         CO        HC        HC        HC        NO        NO        NO
  MODE     MODE    FUEL FLOW     USED     LB/1K     LB/1K    EMISSION   LB/1K     LB/1K   EMISSION    LB/1K     LB/1K   EMISSION
           MIN.      LB/HR       LBS.    LB FUEL    HOURS      LBS.    LB FUEL    HOURS      LBS.    LB FUEL    HOURS      LBS.

   2      12.00      10.50       2.10     676.71    7105.46    1.421     13.71    143.96     0.029     -0.00     -0.00  -0.0000
   6       0.30      66.80       0.33    1093.31   73033.06    0.365     14.80    988.70     0.005     -0.00     -0.00  -0.0000
   7       5.00      66.80       5.54    1093.31   73033.06    6.062     14.80    988.70     0.082     -0.00     -0.00  -0.0000
   9       6.00      17.60       1.76     930.49   16376.57    1.638     15.08    265.43     0.027     -0.00     -0.00  -0.0000
  10       4.00      10.50       0.70     584.89    6141.36    0.411     11.62    121.97     0.008     -0.00     -0.00  -0.0000

 TOTAL FOR CYCLE                10.442                         9.897                         0.151                       -0.0000

 TOTAL FOR CYCLE/LB FUEL                                       0.948                         0.014                       -0.0000
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DATE:   7/28/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  235    ENGINE TYPE AND MODEL:  O-320-E2A              SERIAL NUMBER:   L-27474-27AA

                            RATED HORSEPOWER:   150.

     ENGINE TOTAL TIME:   1025. HRS

     FUEL: AV GAS 80/87             FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   77.00   FINISH   77.00

     ATMOSPHERIC PRESSURE:              START   29.76   FINISH   29.76

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     49.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:



                 CARB.    TEST     ENGINE      MEASURED      MEASURED      CALCULATED
                 HEATER   MODE      RPM        FUEL FLOW     AIR FLOW         F/A
                                                LB/HR         LB/HR

IDLE-LOW                    1       -0.0        17.60        202.00        0.03248
IDLE/TAXI                   2       -0.0        23.40        257.00        0.05133
RUN UP                      3       -0.0        41.00        450.00        0.08189
RUN UP-LEAN                 4       -0.0        32.80        363.00        0.08117
RUN UP-RICH                 5       -0.0        41.00        451.00        0.08176
TAKE-OFF                    6       -0.0        73.80        785.00        0.08619
CLIMB                       7       -0.0        73.80        785.00        0.08619
DESCENT                     8       -0.0        51.60        569.00        0.08219
DESCENT           ON        8       -0.0        51.60        570.00        0.08267
APPROACH                    9       -0.0        28.10        305.00        0.08332
TAXI                       10       -0.0        19.90        243.00        0.04515


 TEST   EXHAUST    EXHAUST      CO         CO        THC       NO        NO        NO     ALDEHYDES    SMOKE     PARTICULATES
 MODE     GAS        GAS       (DRY)        2       (DRY)     (DRY)       2         X       (DRY)
         TEMP      PRESSURE  PERCENT V   (DRY)      PPMV      PPMV     (DRY)     (DRY)
       DEGREES F    PSIA              PERCENT V                        PPMV      PPMV

   1    325.00     -0.00       3.30       3.40    1821.00    -0.00     -0.00     -0.00      7.00      -0.00        -0.00
   2    404.00     -0.00       6.00       4.70    2269.00    -0.00     -0.00     -0.00     -0.00      -0.00        -0.00
   3    964.00     -0.00       9.80       7.50    3277.00    -0.00     -0.00     -0.00     -0.00      -0.00        -0.00
   4    897.00     -0.00       9.60       7.60    2829.00    -0.00     -0.00     -0.00     -0.00      -0.00        -0.00
   5    998.00     -0.00       9.80       7.50    2997.00    -0.00     -0.00     -0.00     -0.00      -0.00        -0.00
   6   1199.00     -0.00      11.10       7.10    3109.00    -0.00     -0.00     -0.00     -0.00      -0.00        -0.00
   7   1199.00     -0.00      11.10       7.10    3109.00    -0.00     -0.00     -0.00      8.00      -0.00        -0.00
   8   1155.00     -0.00       9.80       7.60    2997.00    -0.00     -0.00     -0.00      8.00      -0.00        -0.00
   8   1121.00     -0.00       9.80       7.70    3109.00    -0.00     -0.00     -0.00      7.00      -0.00        -0.00
   9    897.00     -0.00      10.20       7.30    4174.00    -0.00     -0.00     -0.00      8.00      -0.00        -0.00
  10    448.00     -0.00       3.90       5.60    1597.00    -0.00     -0.00     -0.00      6.00      -0.00        -0.00


 TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1      968.71     30.62      0.0    1568.19     -0.00     -0.00  17049.32    538.83      0.0   27600.08     -0.00     -0.00
   2     1109.32     24.03      0.0    1365.34     -0.00     -0.00  25958.02    562.21      0.0   31948.97     -0.00     -0.00
   3     1123.14     21.51      0.0    1350.53     -0.00     -0.00  46048.57    881.88      0.0   55371.89     -0.00     -0.00
   4     1109.33     18.72      0.0    1379.88     -0.00     -0.00  36385.91    614.10      0.0   45259.92     -0.00     -0.00
   5     1124.92     19.70      0.0    1352.68     -0.00     -0.00  46121.82    807.82      0.0   55459.99     -0.00     -0.00
   6     1211.43     19.43      0.0    1217.51     -0.00     -0.00  89403.19   1434.16      0.0   89851.81     -0.00     -0.00
   7     1211.43     19.43      0.0    1217.51     -0.00     -0.00  89403.19   1434.16      0.0   89851.81     -0.00     -0.00
   8     1118.57     19.59      0.0    1362.97     -0.00     -0.00  57718.06   1010.92      0.0   70329.44     -0.00     -0.00
   8     1111.58     20.20      0.0    1372.29     -0.00     -0.00  57357.70   1042.15      0.0   70809.94     -0.00     -0.00
   9     1150.08     26.95      0.0    1293.27     -0.00     -0.00  32317.15    757.41      0.0   36340.76     -0.00     -0.00
  10      815.65     19.13      0.0    1840.20     -0.00     -0.00  16231.38    380.66      0.0   36619.93     -0.00     -0.00


                                                LTO CYCLE EMISSIONS

 TEST    TIME IN   MEASURED    FUEL       CO         CO        CO        HC        HC        HC        NO        NO        NO
 MODE     MODE     FUEL FLOW   USED      LB/1K      LB/1K    EMISSION   LB/1K     LB/1K    EMISSION   LB/1K     LB/1K    EMISSION
          MIN.      LB/HR      LBS.     LB FUEL     HOURS      LBS.    LB FUEL    HOURS      LBS.    LB FUEL    HOURS      LBS.

   2     12.00      23.40      4.68    1109.32   25958.02    5.192     24.03     562.21    0.112     -0.00     -0.00  -0.0000
   6      0.30      73.80      0.37    1211.43   89403.19    0.447     19.43    1434.16    0.007     -0.00     -0.00  -0.0000
   7      5.00      73.80      6.13    1211.43   89403.19    7.420     19.43    1434.16    0.119     -0.00     -0.00  -0.0000
   9      6.00      28.10      2.81    1150.08   32317.15    3.232     26.95     757.41    0.076     -0.00     -0.00  -0.0000
  10      4.00      19.90      1.33     815.65   16231.38    1.088     19.13     380.66    0.026     -0.00     -0.00  -0.0000

TOTAL FOR CYCLE                15.318                        17.378                        0.340                        -0.0000

TOTAL FOR CYCLE/LB FUEL                                       1.135                        0.022                        -0.0000
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DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 236 ENGINE TYPE AND MODEL: O-320-E2A SERIAL NUMBER: L-27474-27A8

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 1026. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 77.50 FINISH 77.50

ATMOSPHERIC PRESSURE: START 29.76 FINISH 29.76

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 51.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	17.60	214.00	0.02283
IDLE/TAXI		2	-0.0	22.30	256.00	0.03554
RUN UP		3	-0.0	37.50	410.00	0.05643
RUN UP-LEAN		4	-0.0	34.00	371.00	0.05455
RUN UP-RICH		5	-0.0	34.00	379.00	0.05859
TAKE-OFF		6	-0.0	70.30	740.00	0.06733
CLIMB		7	-0.0	70.30	740.00	0.06733
DESCENT		8	-0.0	51.60	561.00	0.06189
DESCENT	ON	8	-0.0	52.70	575.00	0.05917
APPROACH		9	-0.0	28.10	301.00	0.05476
TAXI		10	-0.0	22.30	271.00	0.03345

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	269.00	-0.00	1.90	2.80	1269.00	-0.00	-0.00	-0.00	6.00	-0.00	-0.00
2	404.00	-0.00	3.70	3.70	1379.00	-0.00	-0.00	-0.00	6.00	-0.00	-0.00
3	986.00	-0.00	6.70	5.10	2317.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	919.00	-0.00	6.50	4.90	2207.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1166.00	-0.00	6.70	5.60	2207.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1199.00	-0.00	8.70	5.40	2648.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1199.00	-0.00	9.70	5.40	2648.00	-0.00	-0.00	-0.00	6.00	-0.00	-0.00
8	1155.00	-0.00	7.50	5.50	2152.00	-0.00	-0.00	-0.00	6.00	-0.00	-0.00
8	1121.00	-0.00	7.10	5.30	2262.00	-0.00	-0.00	-0.00	6.00	-0.00	-0.00
9	919.00	-0.00	6.70	4.70	2538.00	-0.00	-0.00	-0.00	6.00	-0.00	-0.00
10	504.00	-0.00	2.90	4.10	1104.00	-0.00	-0.00	-0.00	5.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	795.22	30.42	0.0	1841.32	-0.00	-0.00	13995.86	535.37	0.0	32407.25	-0.00	-0.00
2	991.64	21.17	0.0	1553.09	-0.00	-0.00	22113.51	472.03	0.0	34745.30	-0.00	-0.00
3	1124.99	22.28	0.0	1345.50	-0.00	-0.00	42187.24	835.56	0.0	50456.21	-0.00	-0.00
4	1130.01	21.97	0.0	1338.46	-0.00	-0.00	38420.38	747.13	0.0	45507.49	-0.00	-0.00
5	1081.06	20.39	0.0	1419.71	-0.00	-0.00	36755.89	693.43	0.0	48270.14	-0.00	-0.00
6	1223.55	21.33	0.0	1193.26	-0.00	-0.00	86015.50	1499.41	0.0	83886.00	-0.00	-0.00
7	1223.55	21.33	0.0	1193.26	-0.00	-0.00	86015.50	1499.41	0.0	83886.00	-0.00	-0.00
8	1146.54	18.84	0.0	1321.08	-0.00	-0.00	59161.46	972.22	0.0	68167.69	-0.00	-0.00
8	1136.02	20.73	0.0	1332.43	-0.00	-0.00	59868.45	1092.39	0.0	70218.88	-0.00	-0.00
9	1161.47	25.20	0.0	1280.18	-0.00	-0.00	32637.37	708.07	0.0	35972.99	-0.00	-0.00
10	823.96	17.96	0.0	1830.33	-0.00	-0.00	18374.28	400.61	0.0	40816.39	-0.00	-0.00

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	22.30	4.46	991.64	22113.51	4.423	21.17	472.03	0.094	-0.00	-0.00	-0.0000
6	0.30	70.30	0.35	1223.55	86015.50	0.430	21.33	1499.41	0.007	-0.00	-0.00	-0.0000
7	5.00	70.30	5.83	1223.55	86015.50	7.139	21.33	1499.41	0.124	-0.00	-0.00	-0.0000
9	6.00	28.10	2.81	1161.47	32637.37	3.264	25.20	708.07	0.071	-0.00	-0.00	-0.0000
10	4.00	22.30	1.49	823.96	18374.28	1.231	17.96	400.61	0.027	-0.00	-0.00	-0.0000
TOTAL FOR CYCLE			14.950			16.487			0.324			-0.0000
TOTAL FOR CYCLE/LB FUEL						1.103			0.022			-0.0000

DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 237 ENGINE TYPE AND MODEL: O-320-E2A SERIAL NUMBER: L-27474-27AC

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 1025. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 76.50 FINISH 76.50

ATMOSPHERIC PRESSURE: START 29.76 FINISH 29.76

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 50.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.0C, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	19.90	249.00	0.03371
IDLE/TAXI		2	-0.0	19.90	237.00	0.05411
RUN UP		3	-0.0	34.00	369.00	0.08311
RUN UP-LEAN		4	-0.0	32.80	359.00	0.08335
RUN UP-RICH		5	-0.0	32.80	359.00	0.08283
TAKE-OFF		6	-0.0	72.70	764.00	0.08672
CLIMB		7	-0.0	72.70	764.00	0.08672
DESCENT		8	-0.0	50.40	552.00	0.08357
DESCENT	ON	8	-0.0	50.40	562.00	0.08162
APPROACH		9	-0.0	25.80	280.00	0.08232
TAXI		10	-0.0	21.10	261.00	0.05829

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TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	56.00	-0.00	2.50	4.50	1793.00	11.00	-0.00	-0.00	7.00	-0.00	-0.00
2	415.00	-0.00	5.20	6.20	2014.00	20.00	-0.00	-0.00	7.00	-0.00	-0.00
3	919.00	-0.00	10.20	7.30	3724.00	67.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	830.00	-0.00	10.10	7.50	3393.00	43.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	986.00	-0.00	10.00	7.50	3283.00	51.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1188.00	-0.00	11.40	6.90	3062.00	59.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1188.00	-0.00	11.40	6.90	3062.00	59.00	-0.00	-0.00	8.00	-0.00	-0.00
8	1143.00	-0.00	10.10	7.60	2952.00	78.00	-0.00	-0.00	8.00	-0.00	-0.00
8	1121.00	-0.00	9.50	7.80	2952.00	140.00	-0.00	-0.00	7.00	-0.00	-0.00
9	919.00	-0.00	10.10	7.20	3945.00	59.00	-0.00	-0.00	8.00	-0.00	-0.00
10	504.00	-0.00	4.60	7.80	1904.00	36.00	-0.00	-0.00	6.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	703.49	28.90	0.0	1989.62	0.51	0.51	13999.50	575.04	0.0	39593.46	10.12	10.12
2	905.51	20.09	0.0	1696.37	0.57	0.57	18019.70	399.71	0.0	33757.81	11.38	11.38
3	1152.97	24.11	0.0	1296.52	1.24	1.24	39201.08	819.70	0.0	44081.74	42.30	42.30
4	1137.41	21.88	0.0	1327.08	0.80	0.80	37307.10	717.79	0.0	43528.09	26.09	26.09
5	1133.16	21.31	0.0	1335.34	0.95	0.95	37167.69	698.85	0.0	43799.09	31.14	31.14
6	1237.80	19.04	0.0	1177.15	1.05	1.05	89987.63	1384.29	0.0	85578.69	76.50	76.50
7	1237.80	19.04	0.0	1177.15	1.05	1.05	89987.63	1384.29	0.0	85578.69	76.50	76.50
8	1133.88	18.98	0.0	1340.59	1.44	1.44	57147.47	956.62	0.0	67565.81	72.49	72.49
8	1090.77	19.41	0.0	1407.15	2.64	2.64	54974.58	978.36	0.0	70920.31	133.07	133.07
9	1153.15	25.80	0.0	1291.62	1.11	1.11	29751.19	665.54	0.0	33323.73	28.55	28.55
10	738.11	17.50	0.0	1966.51	0.95	0.95	15574.08	369.20	0.0	41493.24	20.02	20.02

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	19.90	3.98	905.51	18019.70	3.604	20.09	399.71	0.080	0.57	11.38	0.0023
6	0.30	72.70	0.36	1237.80	89987.63	0.450	19.04	1384.29	0.007	1.05	76.50	0.0004
7	5.00	72.70	6.03	1237.80	89987.63	7.469	19.04	1384.29	0.115	1.05	76.50	0.0063
9	6.00	25.80	2.58	1153.15	29751.19	2.975	25.80	665.54	0.067	1.11	28.55	0.0029
10	4.00	21.10	1.41	738.11	15574.08	1.043	17.50	369.20	0.025	0.95	20.02	0.0013
TOTAL FOR CYCLE			14.371			15.541			0.293			0.0132
TOTAL FOR CYCLE/LB FUEL						1.081			0.020			0.0009

DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 241 ENGINE TYPE AND MODEL: O-320-E2A SERIAL NUMBER: L-27848-27AA

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 767. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 81.00 FINISH 81.00

ATMOSPHERIC PRESSURE: START 29.80 FINISH 29.80

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 42.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	12.90	156.00	0.03408
IDLE/TAXI		2	-0.0	14.10	170.00	0.05387
RUN UP		3	-0.0	35.20	401.00	0.08032
RUN UP-LEAN		4	-0.0	35.20	404.00	0.08017
RUN UP-RICH		5	-0.0	34.00	392.00	0.07968
TAKE-OFF		6	-0.0	73.80	808.00	0.08647
CLIMB		7	-0.0	73.80	808.00	0.08647
DESCENT		8	-0.0	51.60	579.00	0.08444
DESCENT	ON	8	-0.0	44.50	525.00	0.07802
APPROACH		9	-0.0	22.30	245.00	0.08190
TAXI		10	-0.0	11.70	152.00	0.04331

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TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	381.00	-0.00	3.00	4.10	1436.00	17.00	-0.00	-0.00	13.00	-0.00	-0.00
2	471.00	-0.00	4.90	6.50	1661.00	46.00	-0.00	-0.00	4.00	-0.00	-0.00
3	998.00	-0.00	8.90	8.20	2506.00	189.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	942.00	-0.00	8.70	8.40	2337.00	136.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1076.00	-0.00	8.60	8.40	2280.00	146.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1379.00	-0.00	10.60	7.80	2337.00	159.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1379.00	-0.00	10.60	7.80	2337.00	159.00	-0.00	-0.00	6.00	-0.00	-0.00
8	1312.00	-0.00	9.80	8.20	2337.00	99.00	-0.00	-0.00	5.00	-0.00	-0.00
8	1312.00	-0.00	7.90	8.80	2055.00	321.00	-0.00	-0.00	5.00	-0.00	-0.00
9	1031.00	-0.00	9.80	7.50	3294.00	96.00	-0.00	-0.00	6.00	-0.00	-0.00
10	594.00	-0.00	2.90	6.30	985.00	46.00	-0.00	-0.00	5.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	836.70	22.94	0.0	1796.68	0.78	0.78	10793.39	295.89	0.0	23177.09	10.05	10.05
2	855.88	16.62	0.0	1783.88	1.32	1.32	12067.85	234.29	0.0	25152.75	18.61	18.61
3	1036.28	16.71	0.0	1500.17	3.61	3.61	36477.06	588.24	0.0	52805.84	127.24	127.24
4	1013.98	15.60	0.0	1538.25	2.60	2.60	35692.12	549.11	0.0	54146.53	91.65	91.65
5	1008.48	15.31	0.0	1547.69	2.81	2.81	34288.16	520.63	0.0	52621.50	95.61	95.61
6	1149.23	14.51	0.0	1328.73	2.83	2.83	84813.44	1070.93	0.0	98059.94	208.97	208.97
7	1149.23	14.51	0.0	1328.73	2.83	2.83	84813.44	1070.93	0.0	98059.94	208.97	208.97
8	1085.81	14.83	0.0	1427.51	1.80	1.80	56027.69	765.21	0.0	73659.44	92.97	92.97
8	944.06	14.06	0.0	1652.32	6.30	6.30	42010.79	625.88	0.0	73528.31	280.39	280.39
9	1123.03	21.62	0.0	1350.40	1.81	1.81	25043.50	482.10	0.0	30113.98	40.30	40.30
10	630.07	12.26	0.0	2150.64	1.64	1.64	7371.78	143.40	0.0	25162.49	19.21	19.21

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	14.10	2.82	855.88	12067.85	2.414	16.62	234.29	0.047	1.32	18.61	0.0037
6	0.30	73.80	0.37	1149.23	84813.44	0.424	14.51	1070.93	0.005	2.83	208.97	0.0010
7	5.00	73.80	6.13	1149.23	84813.44	7.040	14.51	1070.93	0.089	2.83	208.97	0.0173
9	6.00	22.30	2.23	1123.03	25043.50	2.504	21.62	482.10	0.048	1.81	40.30	0.0040
10	4.00	11.70	0.78	630.07	7371.78	0.494	12.26	143.40	0.010	1.64	19.21	0.0013
TOTAL FOR CYCLE			12.328			12.875			0.199			0.0274
TOTAL FOR CYCLE/LB FUEL						1.044			0.016			0.0022

DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 242 ENGINE TYPE AND MODEL: O-320-E2A SERIAL NUMBER: L-27848-27A8

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 768. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 82.50 FINISH 82.50

ATMOSPHERIC PRESSURE: START 29.80 FINISH 29.60

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 40.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	12.90	168.00	0.03146
IDLE/TAXI		2	-0.0	12.90	166.00	0.04987
RUN UP		3	-0.0	32.80	373.00	0.08085
RUN UP-LEAN		4	-0.0	31.60	360.00	0.08077
RUN UP-RICH		5	-0.0	32.80	375.00	0.08076
TAKE-OFF		6	-0.0	70.30	765.00	0.08571
CLIMB		7	-0.0	70.30	765.00	0.08571
DESCENT		8	-0.0	50.40	567.00	0.08173
DESCENT	ON	8	-0.0	41.00	485.00	0.07849
APPROACH		9	-0.0	17.60	193.00	0.08103
TAXI		10	-0.0	11.70	154.00	0.04238

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	291.00	-0.00	1.90	4.70	1081.00	26.00	-0.00	-0.00	4.00	-0.00	-0.00
2	404.00	-0.00	3.50	7.10	1414.00	59.00	-0.00	-0.00	7.00	-0.00	-0.00
3	964.00	-0.00	9.00	8.20	2634.00	218.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	852.00	-0.00	9.00	8.20	2468.00	141.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1244.00	-0.00	8.90	8.30	2523.00	139.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1278.00	-0.00	10.60	7.60	2523.00	160.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1278.00	-0.00	10.60	7.60	2523.00	160.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1211.00	-0.00	9.40	8.00	2357.00	131.00	-0.00	-0.00	4.00	-0.00	-0.00
8	1211.00	-0.00	7.90	8.90	2135.00	399.00	-0.00	-0.00	6.00	-0.00	-0.00
9	964.00	-0.00	9.70	7.40	3355.00	114.00	-0.00	-0.00	7.00	-0.00	-0.00
10	471.00	-0.00	2.60	6.40	1026.00	61.00	-0.00	-0.00	5.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	572.21	18.65	0.0	2224.02	1.29	1.29	7381.51	240.53	0.0	28689.85	16.59	16.59
2	658.28	15.23	0.0	2098.16	1.82	1.82	8491.78	196.48	0.0	27066.19	23.51	23.51
3	1041.16	17.45	0.0	1490.48	4.14	4.14	34149.87	572.41	0.0	48887.59	135.87	135.87
4	1042.15	16.37	0.0	1491.89	2.68	2.68	32931.79	517.21	0.0	47143.83	84.74	84.74
5	1030.24	16.73	0.0	1509.61	2.64	2.64	33791.91	548.64	0.0	49515.27	86.69	86.69
6	1160.53	15.82	0.0	1307.38	2.88	2.88	81585.38	1112.16	0.0	91909.06	202.28	202.28
7	1160.53	15.82	0.0	1307.38	2.88	2.88	81585.38	1112.16	0.0	91909.06	202.28	202.28
8	1076.80	15.46	0.0	1439.92	2.46	2.46	54270.95	779.37	0.0	72571.75	124.23	124.23
8	938.07	14.52	0.0	1660.49	7.78	7.78	38460.88	595.30	0.0	68080.06	319.07	319.07
9	1123.93	22.26	0.0	1347.22	2.17	2.17	19781.14	391.85	0.0	23710.98	38.19	38.19
10	577.04	13.04	0.0	2231.80	2.22	2.22	6751.42	152.59	0.0	26112.01	26.02	26.02

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	12.90	2.58	658.28	8491.78	1.698	15.23	196.48	0.039	1.82	23.51	0.0047
6	0.30	70.30	0.35	1160.53	81585.38	0.408	15.82	1112.16	0.006	2.88	202.28	0.0010
7	5.00	70.30	5.83	1160.53	81585.38	6.772	15.82	1112.16	0.092	2.88	202.28	0.0168
9	6.00	17.60	1.76	1123.93	19781.14	1.978	22.26	391.85	0.039	2.17	38.19	0.0038
10	4.00	11.70	0.78	577.04	6751.42	0.452	13.04	152.59	0.010	2.22	26.02	0.0017
TOTAL FOR CYCLE			11.310			11.308			0.187			0.0281
TOTAL FOR CYCLE/LB FUEL						1.000			0.016			0.0025

DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 243 ENGINE TYPE AND MODEL: O-320-E2A SERIAL NUMBER: L-27848-27AC

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 768. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 86.00 FINISH 86.00

ATMOSPHERIC PRESSURE: START 29.80 FINISH 29.80

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 34.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	11.70	159.00	0.03039
IDLE/TAXI		2	-0.0	11.70	154.00	0.04878
RUN UP		3	-0.0	31.60	360.00	0.08037
RUN UP-LEAN		4	-0.0	30.50	346.00	0.07989
RUN UP-RICH		5	-0.0	30.50	349.00	0.08025
TAKE-OFF		6	-0.0	71.50	779.00	0.08610
CLIMB		7	-0.0	71.50	779.00	0.08610
DESCENT		8	-0.0	46.90	523.00	0.08177
DESCENT	ON	8	-0.0	44.50	517.00	0.07909
APPROACH		9	-0.0	17.60	194.00	0.08378
TAXI		10	-0.0	11.70	155.00	0.04185

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES	SMOKE	PARTICULATES
1	269.00	-0.00	1.40	5.00	906.00	16.00	-0.00	-0.00	7.00	-0.00	-0.00
2	392.00	-0.00	3.10	7.30	1180.00	40.00	-0.00	-0.00	9.00	-0.00	-0.00
3	897.00	-0.00	8.90	8.20	2608.00	137.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	785.00	-0.00	8.90	8.10	2498.00	88.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	975.00	-0.00	8.80	8.30	2443.00	96.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1256.00	-0.00	10.60	7.70	2443.00	98.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1256.00	-0.00	10.60	7.70	2443.00	98.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1166.00	-0.00	9.60	7.80	2278.00	68.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1166.00	-0.00	8.40	8.50	2114.00	198.00	-0.00	-0.00	7.00	-0.00	-0.00
9	919.00	-0.00	10.00	7.70	3486.00	77.00	-0.00	-0.00	3.00	-0.00	-0.00
10	437.00	-0.00	2.50	6.40	906.00	40.00	-0.00	-0.00	6.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	435.76	16.15	0.0	2445.26	0.82	0.82	5098.36	188.96	0.0	28609.55	9.57	9.57
2	595.43	12.98	0.0	2203.08	1.26	1.26	6966.52	151.87	0.0	25776.00	14.77	14.77
3	1035.67	17.38	0.0	1499.29	2.62	2.62	32727.20	549.25	0.0	47377.38	82.75	82.75
4	1042.34	16.76	0.0	1490.53	1.69	1.69	31791.24	511.04	0.0	45461.20	51.63	51.63
5	1025.01	16.30	0.0	1519.01	1.84	1.84	31262.77	497.07	0.0	46329.86	56.02	56.02
6	1154.77	15.24	0.0	1318.02	1.75	1.75	82566.31	1089.85	0.0	94238.00	125.38	125.38
7	1154.77	15.24	0.0	1318.02	1.75	1.75	82566.31	1089.85	0.0	94238.00	125.38	125.38
8	1100.21	14.95	0.0	1404.55	1.28	1.28	51599.77	701.25	0.0	65873.25	60.04	60.04
8	991.73	14.29	0.0	1576.79	3.84	3.84	44132.19	636.10	0.0	70167.06	170.87	170.87
9	1119.33	22.35	0.0	1354.21	1.42	1.42	19700.20	393.32	0.0	23834.14	24.92	24.92
10	561.76	11.66	0.0	2259.60	1.48	1.48	6572.63	136.42	0.0	26437.30	17.27	17.27

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	11.70	2.34	595.43	6966.52	1.393	12.98	151.87	0.030	1.26	14.77	0.0030
6	0.30	71.50	0.36	1154.77	82566.31	0.413	15.24	1089.85	0.005	1.75	125.38	0.0006
7	5.00	71.50	5.93	1154.77	82566.31	6.853	15.24	1089.85	0.090	1.75	125.38	0.0104
9	6.00	17.60	1.76	1119.33	19700.20	1.970	22.35	393.32	0.039	1.42	24.92	0.0025
10	4.00	11.70	0.78	561.76	6572.63	0.440	11.66	136.42	0.009	1.48	17.27	0.0012
TOTAL FOR CYCLE			11.176			11.070			0.175			0.0176
TOTAL FOR CYCLE/LB FUEL						0.990			0.016			0.0016

DATE: 7/30/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 251 ENGINE TYPE AND MODEL: O-320-E2A SERIAL NUMBER: L-16344-27AB

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 720. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 74.00 FINISH 72.00

ATMOSPHERIC PRESSURE: START 29.85 FINISH 29.85

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 52.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	14.10	195.00	0.02678
IDLE/TAXI		2	-0.0	16.40	224.00	0.03949
RUN UP		3	-0.0	35.20	399.00	0.07076
RUN UP-LFAN		4	-0.0	34.00	387.00	0.07075
RUN UP-RICH		5	-0.0	34.00	386.00	0.07068
TAKE-OFF		6	-0.0	71.50	812.00	0.07480
CLIMB		7	-0.0	71.50	812.00	0.07480
DESCENT		8	-0.0	45.70	486.00	0.04882
DESCENT	ON	8	-0.0	50.40	548.00	0.07571
APPROACH		9	-0.0	23.40	265.00	0.07176
TAXI		10	-0.0	16.40	226.00	0.03669

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	303.00	-0.00	1.00	4.60	1104.00	36.00	-0.00	-0.00	3.00	-0.00	-0.00
2	437.00	-0.00	1.80	6.60	938.00	71.00	-0.00	-0.00	3.00	-0.00	-0.00
3	1043.00	-0.00	7.90	7.10	2152.00	143.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1009.00	-0.00	7.80	7.20	2207.00	127.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1087.00	-0.00	7.90	7.10	1986.00	97.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1323.00	-0.00	8.40	7.50	2097.00	118.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1323.00	-0.00	8.40	7.50	2097.00	118.00	-0.00	-0.00	3.00	-0.00	-0.00
8	1256.00	-0.00	6.10	4.10	1655.00	295.00	-0.00	-0.00	3.00	-0.00	-0.00
8	1199.00	-0.00	9.30	6.70	2428.00	102.00	-0.00	-0.00	3.00	-0.00	-0.00
9	953.00	-0.00	8.00	7.20	2373.00	110.00	-0.00	-0.00	4.00	-0.00	-0.00
10	471.00	-0.00	1.60	6.20	772.00	98.00	-0.00	-0.00	3.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	353.78	22.37	0.0	2557.00	2.09	2.09	4988.32	315.41	0.0	36053.75	29.50	29.50
2	428.13	12.78	0.0	2466.51	2.77	2.77	7021.27	209.55	0.0	40450.65	45.49	45.49
3	1048.94	16.36	0.0	1481.22	3.12	3.12	36922.73	576.04	0.0	52139.05	109.78	109.78
4	1035.29	16.78	0.0	1501.54	2.77	2.77	35199.84	570.42	0.0	51052.49	94.14	94.14
5	1050.09	15.12	0.0	1482.84	2.12	2.12	35702.96	514.05	0.0	50416.59	72.01	72.01
6	1053.40	15.06	0.0	1477.79	2.43	2.43	75318.06	1076.87	0.0	105662.19	173.79	173.79
7	1053.40	15.06	0.0	1477.79	2.43	2.43	75318.06	1076.87	0.0	105662.19	173.79	173.79
8	1188.89	18.47	0.0	1255.55	9.44	9.44	54332.23	844.25	0.0	57378.58	431.59	431.59
8	1156.71	17.30	0.0	1309.34	2.08	2.08	58298.11	871.70	0.0	65990.94	105.02	105.02
9	1046.94	17.79	0.0	1480.48	2.36	2.36	24498.32	416.19	0.0	34643.13	55.33	55.33
10	410.35	11.34	0.0	2498.39	4.13	4.13	6729.66	185.97	0.0	40973.55	67.70	67.70

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	16.40	3.28	428.13	7021.27	1.404	12.78	209.55	0.042	2.77	45.49	0.0091
6	0.30	71.50	0.36	1053.40	75318.06	0.377	15.06	1076.87	0.005	2.43	173.79	0.0009
7	5.00	71.50	5.93	1053.40	75318.06	6.251	15.06	1076.87	0.089	2.43	173.79	0.0144
9	6.00	23.40	2.34	1046.94	24498.32	2.450	17.79	416.19	0.042	2.36	55.33	0.0055
10	4.00	16.40	1.10	410.35	6729.66	0.451	11.34	185.97	0.012	4.13	67.70	0.0045
TOTAL FOR CYCLE			13.011			10.933			0.191			0.0345
TOTAL FOR CYCLE/LB FUEL						0.840			0.015			0.0026

DATE: 7/30/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 252 ENGINE TYPE AND MODEL: O-320-E2A SERIAL NUMBER: L-16344-27AC

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 720. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 71.00 FINISH 72.00

ATMOSPHERIC PRESSURE: START 29.85 FINISH 29.85

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 57.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	14.10	189.00	0.02767
IDLE/TAXI		2	-0.0	14.10	186.00	0.04018
RUN UP		3	-0.0	34.00	383.00	0.06901
RUN UP-LEAN		4	-0.0	32.80	373.00	0.06889
RUN UP-RICH		5	-0.0	34.00	383.00	0.07027
TAKF-OFF		6	-0.0	69.10	790.00	0.07372
CLIMB		7	-0.0	69.10	790.00	0.07372
DESCENT		8	-0.0	41.00	500.00	0.06863
DESCENT	ON	8	-0.0	44.50	517.00	0.07097
APPROACH		9	-0.0	22.30	254.00	0.07033
TAXI		10	-0.0	14.10	191.00	0.03772

9883

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO_2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO_2 (DRY) PPMV	NO_X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	280.00	-0.00	1.40	4.40	933.00	23.00	-0.00	-0.00	3.00	-0.00	-0.00
2	426.00	-0.00	2.40	6.10	1208.00	46.00	-0.00	-0.00	3.00	-0.00	-0.00
3	998.00	-0.00	7.80	6.80	2196.00	119.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	942.00	-0.00	7.60	7.00	2086.00	92.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1054.00	-0.00	8.00	6.90	1976.00	81.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1323.00	-0.00	8.10	7.60	1867.00	110.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1323.00	-0.00	8.10	7.60	1867.00	110.00	-0.00	-0.00	4.00	-0.00	-0.00
8	1233.00	-0.00	6.20	8.50	1592.00	196.00	-0.00	-0.00	3.00	-0.00	-0.00
8	1199.00	-0.00	7.50	7.60	1976.00	305.00	-0.00	-0.00	3.00	-0.00	-0.00
9	919.00	-0.00	7.70	7.20	2306.00	111.00	-0.00	-0.00	4.00	-0.00	-0.00
10	448.00	-0.00	1.80	6.20	988.00	102.00	-0.00	-0.00	3.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	479.92	18.32	0.0	2369.92	1.30	1.30	6766.91	258.28	0.0	33415.92	18.26	18.26
2	562.43	16.21	0.0	2246.07	1.77	1.77	7930.21	228.60	0.0	31669.52	24.97	24.97
3	1063.31	17.15	0.0	1456.51	2.66	2.66	36152.54	582.94	0.0	49521.21	90.60	90.60
4	1036.82	16.30	0.0	1500.46	2.06	2.06	34007.54	534.59	0.0	49215.02	67.62	67.62
5	1070.49	15.14	0.0	1450.71	1.78	1.78	36396.76	514.88	0.0	49324.72	60.53	60.53
6	1030.04	13.60	0.0	1518.52	2.30	2.30	71175.56	939.58	0.0	104929.50	158.77	158.77
7	1030.04	13.60	0.0	1518.52	2.30	2.30	71175.56	939.58	0.0	104929.50	158.77	158.77
8	842.94	12.40	0.0	1815.78	4.38	4.38	34560.65	508.25	0.0	74447.00	179.46	179.46
8	990.47	14.95	0.0	1576.99	6.62	6.62	44075.76	665.08	0.0	70176.25	294.41	294.41
9	1028.10	17.63	0.0	1510.48	2.43	2.43	22926.66	393.24	0.0	33603.77	54.29	54.29
10	449.01	14.12	0.0	2430.03	4.18	4.18	6331.00	199.02	0.0	34263.38	58.93	58.93

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	14.10	2.82	562.43	7930.21	1.586	16.21	228.60	0.046	1.77	24.97	0.0050
6	0.30	69.10	0.35	1030.04	71175.56	0.356	13.60	939.58	0.005	2.30	158.77	0.0008
7	5.00	69.10	5.74	1030.04	71175.56	5.908	13.60	939.58	0.078	2.30	158.77	0.0132
9	6.00	22.30	2.23	1028.10	22926.66	2.293	17.63	393.24	0.039	2.43	54.29	0.0054
10	4.00	14.10	0.94	449.01	6331.00	0.424	14.12	199.02	0.013	4.18	58.93	0.0039
TOTAL FOR CYCLE			12.075			10.566			0.181			0.0283
TOTAL FOR CYCLE/LB FUEL						0.875			0.015			0.0023

DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 260   ENGINE TYPE AND MODEL: O-320-E2A   SERIAL NUMBER: L-29302-27AB

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 130. HRS

FUEL: AV GAS 80/87   FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 86.00 FINISH 86.00

ATMOSPHERIC PRESSURE: START 30.15 FINISH 30.15

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 45.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	7.00	87.00	0.05453
IDLE/TAXI		2	-0.0	5.30	63.00	0.06875
RUN UP		3	-0.0	15.80	182.00	0.07399
RUN UP-LEAN		4	-0.0	15.80	183.00	0.07344
RUN UP-RICH		5	-0.0	15.80	183.00	0.07334
TAKE-OFF		6	-0.0	38.70	436.00	0.07891
CLIMB		7	-0.0	38.70	436.00	0.07891
DESCENT		8	-0.0	22.90	274.00	0.07295
DESCENT	ON	8	-0.0	22.90	279.00	0.07187
APPROACH		9	-0.0	15.80	178.00	0.07429
TAXI		10	-0.0	5.30	66.00	0.06204

3885

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NU 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	791.00	-0.00	4.40	7.10	2425.00	30.00	-0.00	-0.00	9.00	-0.00	-0.00
2	404.00	-0.00	6.40	8.20	2647.00	51.00	-0.00	-0.00	7.00	-0.00	-0.00
3	1020.00	-0.00	8.00	7.70	2536.00	109.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	986.00	-0.00	7.80	7.80	2425.00	96.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1076.00	-0.00	7.80	7.80	2202.00	73.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1300.00	-0.00	9.00	7.80	2146.00	8.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1300.00	-0.00	9.00	7.80	2146.00	8.00	-0.00	-0.00	6.00	-0.00	-0.00
8	1222.00	-0.00	7.00	8.60	1979.00	34.00	-0.00	-0.00	5.00	-0.00	-0.00
8	1188.00	-0.00	6.50	8.90	1867.00	109.00	-0.00	-0.00	4.00	-0.00	-0.00
9	919.00	-0.00	8.40	7.30	2870.00	65.00	-0.00	-0.00	4.00	-0.00	-0.00
10	448.00	-0.00	5.10	8.10	2146.00	62.00	-0.00	-0.00	6.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NU2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	757.00	23.89	0.0	1919.28	0.85	0.85	5298.97	167.26	0.0	13434.95	5.93	5.93
2	869.81	20.60	0.0	1751.05	1.14	1.14	4610.00	109.20	0.0	9280.54	6.03	6.03
3	1013.06	18.39	0.0	1532.05	2.27	2.27	16006.27	290.60	0.0	24206.34	35.82	35.82
4	994.66	17.71	0.0	1562.83	2.01	2.01	15715.56	279.83	0.0	24692.66	31.77	31.77
5	996.06	16.10	0.0	1565.03	1.53	1.53	15737.71	254.45	0.0	24727.46	24.19	24.19
6	1068.62	14.59	0.0	1455.17	0.16	0.16	41355.53	564.76	0.0	56314.95	6.04	6.04
7	1068.62	14.59	0.0	1455.17	0.16	0.16	41355.53	564.76	0.0	56314.95	6.04	6.04
8	895.16	14.49	0.0	1727.98	0.71	0.71	20499.14	331.92	0.0	39570.77	16.35	16.35
8	842.48	13.86	0.0	1812.49	2.32	2.32	19292.84	317.38	0.0	41506.02	53.14	53.14
9	1061.49	20.77	0.0	1449.43	1.35	1.35	16771.47	328.19	0.0	22900.91	21.32	21.32
10	768.06	18.51	0.0	1916.67	1.53	1.53	4070.71	98.10	0.0	10158.34	8.13	8.13

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	5.30	1.06	869.81	4610.00	0.922	20.60	109.20	0.022	1.14	6.03	0.0012
6	0.30	38.70	0.19	1068.62	41355.53	0.207	14.59	564.76	0.003	0.16	6.04	0.0000
7	5.00	38.70	3.21	1068.62	41355.53	3.433	14.59	564.76	0.047	0.16	6.04	0.0005
9	6.00	15.80	1.58	1061.49	16771.47	1.677	20.77	328.19	0.033	1.35	21.32	0.0021
10	4.00	5.30	0.36	768.06	4070.71	0.273	18.51	98.10	0.007	1.53	8.13	0.0005
TOTAL FOR CYCLE			6.401			6.511			0.111			0.0044
TOTAL FOR CYCLE/LB FUEL						1.017			0.017			0.0007

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DATE:   7/28/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  261    ENGINE TYPE AND MODEL:  O-320-E2A                 SERIAL NUMBER:   L-29302-27AC

                            RATED HORSEPOWER:   150.

     ENGINE TOTAL TIME:    130. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   68.00   FINISH   88.00

     ATMOSPHERIC PRESSURE:              START   30.15   FINISH   30.15

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     49.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:




                 CARB.     TEST      ENGINE       MEASURED       MEASURED       CALCULATED
                 HEATER    MODE       RPM         FUEL FLOW      AIR FLOW          F/A
                                                    LB/HR          LB/HR

IDLE-LOW                    1          -0.0          7.00          87.00          0.05272
IDLE/TAXI                   2          -0.0          7.00          83.00          0.06977
RUN UP                      3          -0.0         15.80         182.00          0.06718
RUN UP-LEAN                 4          -0.0         15.90         183.00          0.07472
RUN UP-RICH                 5          -0.0         15.80         182.00          0.06655
TAKE-OFF                    6          -0.0         38.70         435.00          0.07031
CLIMB                       7          -0.0         38.70         435.00          0.07031
DESCENT                     8          -0.0         21.10         253.00          0.06529
DESCENT           ON        8          -0.0         24.60         284.00          0.06699
APPROACH                    9          -0.0         14.10         157.00          0.06755
TAXI                       10          -0.0          5.30          66.00          0.05838


 TEST   EXHAUST     EXHAUST       CO          CO         THC         NO          NO          NO       ALDEHYDES     SMOKE     PARTICULATES
 MODE     GAS         GAS        (DRY)         2        (DRY)       (DRY)         2           X         (DRY)
         TEMP      PRESSURE   PERCENT V     (DRY)       PPMV        PPMV        (DRY)       (DRY)
       DEGREES F     PSIA                 PERCENT V                             PPMV        PPMV

   1     -0.00       -0.00        4.40        6.70    2317.00       27.00       -0.00       -0.00        8.00       -0.00          -0.00
   2    448.00       -0.00        6.80        8.00    2704.00       47.00       -0.00       -0.00        7.00       -0.00          -0.00
   3   1043.00       -0.00        7.20        7.00    2428.00       98.00       -0.00       -0.00       -0.00       -0.00          -0.00
   4   1009.00       -0.00        7.90        8.00    2317.00       80.00       -0.00       -0.00       -0.00       -0.00          -0.00
   5   1065.00       -0.00        7.10        7.00    2097.00       67.00       -0.00       -0.00       -0.00       -0.00          -0.00
   6   1289.00       -0.00        9.00        6.90    2042.00        8.00       -0.00       -0.00       -0.00       -0.00          -0.00
   7   1289.00       -0.00        8.00        6.90    2042.00        8.00       -0.00       -0.00        8.00       -0.00          -0.00
   8   1211.00       -0.00        6.20        7.70    1876.00       34.00       -0.00       -0.00        5.00       -0.00          -0.00
   8   1188.00       -0.00        7.10        7.10    2097.00       67.00       -0.00       -0.00        4.00       -0.00          -0.00
   9    942.00       -0.00        7.70        6.50    2869.00       48.00       -0.00       -0.00        4.00       -0.00          -0.00
  10    448.00       -0.00        4.60        7.80    2097.00       66.00       -0.00       -0.00        5.00       -0.00          -0.00


 TEST     MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 MODE        CO         HC         NO2        CO2         NO        NOX         CO         HC         NO2        CO2         NO        NOX
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1       784.44      23.66        0.0    1876.81       0.79       0.79    5491.07     165.61        0.0   13137.65       5.53       5.53
   2       911.56      20.76        0.0    1685.02       1.03       1.03    6380.93     145.32        0.0   11795.14       7.24       7.24
   3      1007.12      19.45        0.0    1538.46       2.25       2.25   15912.56     307.33        0.0   24307.69      35.58      35.58
   4       989.35      16.62        0.0    1574.16       1.65       1.65   15631.69     262.57        0.0   24871.78      26.00      26.00
   5      1002.37      16.96        0.0    1552.77       1.55       1.55   15837.50     267.90        0.0   24533.78      24.55      24.55
   6      1070.03      15.64        0.0    1450.08       0.18       0.18   41409.97     605.36        0.0   56118.02       6.80       6.80
   7      1070.03      15.64        0.0    1450.08       0.18       0.18   41409.97     605.36        0.0   56118.02       6.80       6.80
   8       889.11      15.41        0.0    1734.98       0.80       0.80   18760.25     325.11        0.0   36607.98      16.90      16.90
   8       995.42      16.84        0.0    1564.03       1.54       1.54   24487.26     414.21        0.0   38474.99      37.96      37.96
   9      1073.78      22.91        0.0    1424.22       1.10       1.10   15140.36     323.09        0.0   20081.54      15.50      15.50
  10       736.98      19.24        0.0    1963.50       1.74       1.74    3905.98     101.98        0.0   10406.52       9.21       9.21


                                                       LTO CYCLE EMISSIONS

 TEST     TIME IN    MEASURED     FUEL        CO          CO          CO          HC          HC          HC          NO          NO          NO
 MODE      MODE     FUEL FLOW     USED       LB/1K       LB/1K     EMISSION      LB/1K       LB/1K     EMISSION      LB/1K       LB/1K     EMISSION
           MIN.       LB/HR       LBS.      LB FUEL      HOURS       LBS.       LB FUEL      HOURS       LBS.       LB FUEL      HOURS       LBS.

   2      12.00        7.00       1.40      911.56     6380.93      1.276       20.76      145.32      0.029        1.03        7.24      0.0014
   6       0.30       38.70       0.19     1070.03    41409.97      0.207       15.64      605.36      0.003        0.18        6.80      0.0000
   7       5.00       38.70       3.21     1070.03    41409.97      3.437       15.64      605.36      0.050        0.18        6.80      0.0006
   9       6.00       14.10       1.41     1073.78    15140.36      1.514       22.91      323.09      0.032        1.10       15.50      0.0016
  10       4.00        5.30       0.36      736.98     3905.98      0.262       19.24      101.98      0.007        1.74        9.21      0.0006

TOTAL FOR CYCLE                  6.571                            6.696                             0.121                             0.0042

TOTAL FOR CYCLE/LB FUEL                                           1.019                             0.018                             0.0006
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  160    ENGINE TYPE AND MODEL:  O-320-E2D                 SERIAL NUMBER:   L-23495-27AA

                            RATED HORSEPOWER:   150.

     ENGINE TOTAL TIME:     527. HRS

     FUEL: AV GAS 80/87               FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   80.00   FINISH   80.00

     ATMOSPHERIC PRESSURE:              START   30.09   FINISH   30.05

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                    68.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  11

 COMMENTS:
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                  CARB.    TEST     ENGINE      MEASURED      MEASURED      CALCULATED
                  HEATER   MODE      RPM        FUEL FLOW     AIR FLOW         F/A
                                                 LB/HR         LB/HR

IDLE-LOW                    1        -0.0          5.60         69.00        0.06636
IDLE/TAXI                   2        -0.0          8.10        100.00        0.06508
RUN UP                      3        -0.0         26.40        320.00        0.07119
RUN UP-LEAN                 4        -0.0         23.70        294.00        0.06432
RUN UP-RICH                 5        -0.0         24.60        306.00        0.06914
TAKE-OFF                    6        -0.0         51.50        613.00        0.07287
CLIMB                       7        -0.0         51.50         -0.00        0.07545
DESCENT                     8        -0.0         35.50        453.00        0.07080
DESCENT            ON       8        -0.0         35.50        420.00        0.07340
APPROACH                    9        -0.0         14.10        174.00        0.06850
TAXI                       10        -0.0          6.40         88.00        0.05318
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  TEST   EXHAUST     EXHAUST      CO         CO        THC       NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
. MODE     GAS         GAS       (DRY)        2       (DRY)     (DRY)       2         X        (DRY)
          TEMP      PRESSURE   PERCENT V   (DRY)      PPMV      PPMV     (DRY)     (DRY)
        DEGREES F     PSIA               PERCENT V                       PPMV      PPMV

   1     560.00      -0.00       5.30       8.70    3860.00     24.00    -0.00     -0.00      14.00      -0.00       -0.00
   2     560.00      -0.00       5.50       8.30    2835.00     45.00    -0.00     -0.00       9.00      -0.00       -0.00
   3    1009.00      -0.00       6.30       8.90    2412.00    268.00    -0.00     -0.00      -0.00      -0.00       -0.00
   4     953.00      -0.00       5.50       8.20    2111.00    162.00    -0.00     -0.00      -0.00      -0.00       -0.00
   5    1043.00      -0.00       5.90       8.90    1990.00    163.00    -0.00     -0.00      -0.00      -0.00       -0.00
   6    1334.00      -0.00       7.50       8.00    2352.00    173.00    -0.00     -0.00      -0.00      -0.00       -0.00
   7    1334.00      -0.00       7.50       8.60    2352.00    173.00    -0.00     -0.00       9.00      -0.00       -0.00
   8    1256.00      -0.00       5.40       9.80    2232.00    465.00    -0.00     -0.00       2.00      -0.00       -0.00
   8    1222.00      -0.00       7.30       8.30    2714.00    268.00    -0.00     -0.00       4.00      -0.00       -0.00
   9     964.00      -0.00       5.90       8.70    2473.00    163.00    -0.00     -0.00       7.00      -0.00       -0.00
  10     650.00      -0.00       2.30       9.10    1628.00     85.00    -0.00     -0.00       9.00      -0.00       -0.00
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  TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
           LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
          LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1      744.28     31.05       0.0   1919.64      0.67      0.67   4167.98    173.85       0.0   10749.96      3.75      3.75
   2      788.96     23.29       0.0   1870.71      1.06      1.06   6390.56    188.66       0.U   15152.79      8.59      8.59
   3      824.25     18.07       0.0   1829.57      5.76      5.76  21760.31    477.14       0.0   48300.66    152.05    152.05
   4      798.74     17.56       0.0   1871.08      3.86      3.86  18930.02    416.12       0.0   44344.59     91.58     91.58
   5      794.68     15.35       0.0   1883.51      3.61      3.61  19549.07    377.64       0.0   46334.32     88.71     88.71
   6      962.92     17.29       0.0   1613.83      3.65      3.65  49590.45    890.67       0.0   83112.19    187.89    187.89
   7      927.55     16.66       0.0   1671.14      3.51      3.51  47768.96    857.96       0.0   86063.94    180.99    180.99
   8      707.33     16.74       0.0   2016.93     10.00     10.00  25110.15    594.42       0.0   71601.13    355.16    355.16
   8      929.20     19.79       0.0   1659.98      5.60      5.60  32986.62    702.38       0.0   58929.30    198.92    198.92
   9      802.80     19.27       0.0   1860.00      3.64      3.64  11319.45    271.73       0.0   26225.92     51.37     51.37
  10      401.85     16.29       0.0   2498.15      2.44      2.44   2571.85    104.26       0.0   15988.15     15.61     15.61
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                                                     LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL       CO         CO         CO        HC        HC         HC        NO        NO         NO
  MODE     MODE     FUEL FLOW   USED      LB/1K      LB/1K    EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION
           MIN.      LB/HR      LBS.     LB FUEL     HOURS      LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.

   2      12.00       8.10      1.62     788.96    6390.56     1.278      23.29    188.66     0.038      1.06      8.59     0.0017
   6       0.30      51.50      0.26     962.92   49590.45     0.248      17.29    890.67     0.004      3.65    187.89     0.0009
   7       5.00      51.50      4.27     927.55   47768.96     3.965      16.66    857.96     0.071      3.51    180.99     0.0150
   9       6.00      14.10      1.41     802.80   11319.45     1.132      19.27    271.73     0.027      3.64     51.37     0.0051
  10       4.00       6.40      0.43     401.85    2571.85     0.172      16.29    104.26     0.007      2.44     15.61     0.0010

 TOTAL FOR CYCLE                7.991                          6.795                          0.148                          0.0239

 TOTAL FOR CYCLE/LB FUEL                                       0.850                          0.018                          0.0030
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DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 161 ENGINE TYPE AND MODEL: O-320-E2D SERIAL NUMBER: L-23495-27AB

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 527. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 85.50 FINISH 85.50

ATMOSPHERIC PRESSURE: START 30.10 FINISH 30.10

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 58.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	4.70	65.00	0.05011
IDLE/TAXI		2	-0.0	6.40	86.00	0.05939
RUN UP		3	-0.0	24.60	305.00	0.07116
RUN UP-LEAN		4	-0.0	22.00	276.00	0.06857
RUN UP-RICH		5	-0.0	22.00	272.00	0.07149
TAKE-OFF		6	-0.0	53.50	720.00	0.07218
CLIMB		7	-0.0	53.50	720.00	0.07218
DESCENT		8	-0.0	39.20	500.00	0.07296
DESCENT	ON	8	-0.0	34.60	404.00	0.07755
APPROACH		9	-0.0	15.80	197.00	0.07153
TAXI		10	-0.0	4.70	65.00	0.05420

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	516.00	-0.00	1.70	8.70	4795.00	46.00	-0.00	-0.00	21.00	-0.00	-0.00
2	560.00	-0.00	3.30	9.40	2262.00	70.00	-0.00	-0.00	13.00	-0.00	-0.00
3	998.00	-0.00	6.10	9.10	2503.00	280.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	942.00	-0.00	5.60	9.10	1900.00	143.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1054.00	-0.00	6.20	9.10	2201.00	160.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	-0.00	-0.00	4.20	11.50	1478.00	971.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	-0.00	-0.00	4.20	11.50	1478.00	971.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1199.00	-0.00	5.60	10.10	2141.00	478.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1143.00	-0.00	8.00	8.50	2804.00	253.00	-0.00	-0.00	5.00	-0.00	-0.00
9	930.00	-0.00	6.00	9.30	2443.00	168.00	-0.00	-0.00	7.00	-0.00	-0.00
10	605.00	-0.00	2.30	9.30	1960.00	78.00	-0.00	-0.00	9.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	315.68	50.49	0.0	2538.34	1.40	1.40	1483.68	239.68	0.0	11930.21	6.59	6.59
2	515.76	20.25	0.0	2308.33	1.80	1.80	3300.84	129.58	0.0	14773.27	11.50	11.50
3	797.62	18.74	0.0	1869.58	6.01	6.01	19621.38	461.11	0.0	45991.67	147.94	147.94
4	759.79	14.76	0.0	1939.93	3.19	3.19	16715.44	324.81	0.0	42678.54	70.11	70.11
5	807.05	16.41	0.0	1861.17	3.42	3.42	17755.04	360.99	0.0	40945.83	75.26	75.26
6	535.40	10.79	0.0	2303.40	20.33	20.33	28644.13	577.31	0.0	123231.75	1087.74	1087.74
7	535.40	10.79	0.0	2303.40	20.33	20.33	28644.13	577.31	0.0	123231.75	1087.74	1087.74
8	710.90	15.57	0.0	2014.56	9.97	9.97	27867.23	610.19	0.0	78970.63	390.71	390.71
8	963.14	19.13	0.0	1607.89	5.00	5.00	33324.64	668.96	0.0	55633.01	173.11	173.11
9	779.80	18.18	0.0	1899.12	3.59	3.59	12320.80	287.31	0.0	30006.05	56.67	56.67
10	393.91	19.23	0.0	2502.58	2.19	2.19	1851.37	90.36	0.0	11762.13	10.31	10.31

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	6.40	1.28	515.76	3300.84	0.660	20.25	129.58	0.026	1.80	11.50	0.0023
6	0.30	53.50	0.27	535.40	28644.13	0.143	10.79	577.31	0.003	20.33	1087.74	0.0054
7	5.00	53.50	4.44	535.40	28644.13	2.377	10.79	577.31	0.048	20.33	1087.74	0.0903
9	6.00	15.80	1.58	779.80	12320.80	1.232	18.18	287.31	0.029	3.59	56.67	0.0057
10	4.00	4.70	0.31	393.91	1851.37	0.124	19.23	90.36	0.006	2.19	10.31	0.0007
TOTAL FOR CYCLE			7.883			4.537			0.112			0.1044
TOTAL FOR CYCLE/LB FUEL						0.576			0.014			0.0132

DATE: 7/16/71
TEST ORGANIZATION: SCOTT/GEN AVIATION
ENGINE SUPPLIER: LYCOMING
ENGINE DATA **
CAL ID NUMBER: 162 ENGINE TYPE AND MODEL: O-320-E2D SERIAL NUMBER: L-23495-27AC
RATED HORSEPOWER: 150.
ENGINE TOTAL TIME: 5273. HRS
FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840
OPERATIONAL DATA **
INLET AIR TEMPERATURE, DEGREES F: START 89.00 FINISH 89.00
ATMOSPHERIC PRESSURE: START 30.10 FINISH 30.10
INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01
RELATIVE HUMIDITY: 43.00 PERCENT
SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00
SAMPLE LINE TRANSPORT TIME, SEC: 1.60
NUMBER OF TESTS: 11
COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	6.40	84.00	0.05117
IDLE/TAXI		2	-0.0	8.90	109.00	0.06463
RUN UP		3	-0.0	26.40	322.00	0.07262
RUN UP-LEAN		4	-0.0	26.40	322.00	0.06532
RUN UP-RICH		5	-0.0	26.40	325.00	0.06972
TAKE-OFF		6	-0.0	66.30	742.00	0.08012
CLIMB		7	-0.0	68.30	765.00	0.08010
DESCENT		8	-0.0	32.80	413.00	0.07226
DESCENT	ON	8	-0.0	35.50	416.00	0.07578
APPROACH		9	-0.0	15.00	181.00	0.07273
TAXI		10	-0.0	6.40	88.00	0.05350

TEST MODE	EXHAUST GAS TEMP DEGREES F	FXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	474.00	-0.00	3.20	7.60	2490.00	37.00	-0.00	-0.00	8.00	-0.00	-0.00
2	628.00	-0.00	5.70	8.00	2664.00	56.00	-0.00	-0.00	9.00	-0.00	-0.00
3	1031.00	-0.00	6.60	8.90	2490.00	218.00	-C.00	-0.00	-0.00	-0.00	-0.00
4	897.00	-0.00	5.90	8.00	2143.00	95.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1065.00	-0.00	6.20	8.70	2085.00	136.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1345.00	-0.00	9.30	7.70	2664.00	106.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1379.00	-0.00	9.30	7.70	2606.00	73.00	-0.00	-0.00	6.00	-0.00	-0.00
A	1233.00	-0.00	5.80	9.70	2316.00	393.00	-0.00	-0.00	8.00	-0.00	-0.00
8	1188.00	-0.00	7.80	8.30	2838.00	239.00	-0.00	-0.00	10.00	-0.00	-0.00
9	975.00	-0.00	6.70	8.80	2664.00	116.00	-0.00	-0.00	8.00	-0.00	-0.00
10	617.00	-0.00	2.30	9.10	2316.00	49.00	-0.00	-0.00	3.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	585.10	26.07	0.0	2183.39	1.11	1.11	3744.63	166.88	0.0	13973.66	7.11	7.11
2	824.50	22.07	0.0	1818.22	1.33	1.33	7338.07	196.42	0.0	16182.13	11.84	11.84
3	846.63	18.29	0.0	1793.81	4.59	4.59	22350.98	482.94	0.0	47356.64	121.26	121.26
4	844.49	17.57	0.0	1799.16	2.23	2.23	22294.52	463.78	0.0	47497.A9	58.96	58.96
5	829.03	15.97	0.0	1827.84	2.99	2.99	21886.47	421.54	0.0	48254.73	78.86	78.86
6	1088.14	17.85	0.0	1415.56	2.04	2.04	72143.31	1183.57	0.0	93851.69	135.06	135.06
7	1088.50	17.47	0.0	1416.04	1.40	1.40	74344.56	1193.12	0.0	96715.25	95.85	95.85
8	744.83	17.03	0.0	1957.22	8.29	8.29	24430.39	558.71	0.0	64196.71	271.90	271.90
8	961.79	20.04	0.0	1608.06	4.84	4.84	34143.66	711.50	0.0	57086.27	171.84	171.84
9	858.51	19.55	0.0	1771.70	2.44	2.44	12877.61	293.25	0.0	26575.50	36.62	36.62
10	399.48	23.04	0.0	2483.37	1.40	1.40	2556.64	147.44	0.0	15893.58	8.95	8.95

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	8.90	1.78	824.50	7338.07	1.468	22.07	196.42	0.039	1.33	11.84	0.0024
6	0.30	66.30	0.33	1088.14	72143.31	0.361	17.85	1183.57	0.006	2.04	135.06	0.0007
7	5.00	68.30	5.67	1088.50	74344.56	6.171	17.47	1193.12	0.099	1.40	95.85	0.0080
9	6.00	15.00	1.50	858.51	12877.61	1.288	19.55	293.25	0.029	2.44	36.62	0.0037
10	4.00	6.40	0.43	399.48	2556.64	0.171	23.04	147.44	0.010	1.40	8.95	0.0006
TOTAL FOR CYCLE			9.709			9.458			0.183			0.0153
TOTAL FOR C[illegible]LE/LB FUEL						0.974			0.019			0.0016

DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 175 ENGINE TYPE AND MODEL: O-320-E2D SERIAL NUMBER: L-26284-27AA

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 426. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 82.00 FINISH 82.50

ATMOSPHERIC PRESSURE: START 30.17 FINISH 30.17

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 73.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	6.40	73.00	0.07438
IDLE/TAXI		2	-0.0	12.40	124.00	0.06961
RUN UP		3	-0.0	26.40	328.00	0.06925
RUN UP-LEAN		4	-0.0	26.40	327.00	0.06472
RUN UP-RICH		5	-0.0	26.40	325.00	0.06958
TAKE-OFF		6	-0.0	69.30	785.00	0.08279
CLIMB		7	-0.0	69.30	785.00	0.08279
DESCENT		8	-0.0	37.40	484.00	0.07387
DESCENT	ON	8	-0.0	40.10	507.00	0.07591
APPROACH		9	-0.0	17.60	214.00	0.07337
TAXI		10	-0.0	8.10	94.00	0.06928

9845

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	460.00	-0.00	7.50	7.90	6548.00	12.00	-0.00	-0.00	34.00	-0.00	-0.00
2	437.00	-0.00	8.70	5.20	7372.00	6.00	-0.00	-0.00	28.00	-0.00	-0.00
3	807.00	-0.00	5.90	8.70	1926.00	232.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	740.00	-0.00	5.60	8.20	1990.00	120.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	863.00	-0.00	6.20	8.70	1797.00	130.00	-0.00	-0.00 /	-0.00	-0.00	-0.00
6	1368.00	-0.00	9.50	8.20	1797.00	59.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1368.00	-0.00	9.50	8.20	1797.00	59.00	-0.00	-0.00	9.00	-0.00	-0.00
8	1166.00	-0.00	5.40	10.60	1476.00	588.00	-0.00	-0.00	[illegible]	-0.00	-0.00
8	1166.00	-0.00	6.20	10.20	1605.00	633.00	-0.00	-0.00	12.00	-0.00	-0.00
9	807.00	-0.00	6.80	8.90	2118.00	167.00	-0.00	-0.00	18.00	-0.00	-0.00
10	516.00	-0.00	7.20	7.40	3210.00	37.00	-0.00	-0.00	15.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	943.75	47.19	0.0	1561.93	0.25	0.25	6040.01	302.02	0.0	9996.36	1.59	1.59
2	1184.59	73.08	0.0	1112.48	0.13	0.13	14688.95	906.25	0.0	13794.73	1.66	1.66
3	805.77	15.06	0.0	1866.87	5.20	5.20	21272.23	397.71	0.0	49285.43	137.39	137.39
4	808.15	16.45	0.0	1859.33	2.84	2.84	21335.19	434.22	0.0	49086.36	75.09	75.09
5	830.62	13.79	0.0	1831.33	2.86	2.86	21928.27	364.00	0.0	48347.09	75.52	75.52
6	1073.41	11.63	0.0	1455.77	1.09	1.09	74387.13	805.88	0.0	100884.94	75.88	75.88
7	1073.41	11.63	0.0	1455.77	1.09	1.09	74387.13	805.88	0.0	100884.94	75.88	75.88
8	675.60	10.58	0.0	2083.71	12.08	12.08	25267.30	395.55	0.0	77930.81	451.92	451.92
8	756.35	11.21	0.0	1955.09	12.68	12.68	30329.43	449.67	0.0	78399.06	508.62	508.62
9	863.36	15.40	0.0	1775.46	3.48	3.48	15195.11	271.06	0.0	31248.06	61.30	61.30
10	974.85	24.89	0.0	1574.25	0.82	0.82	7896.26	201.62	0.0	12751.43	6.67	6.67

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	12.40	2.48	1184.59	14688.95	2.938	73.08	906.25	0.181	0.13	1.66	0.0003
6	0.30	69.30	0.35	1073.41	74387.13	0.372	11.63	805.88	0.004	1.09	75.88	0.0004
7	5.00	69.30	5.75	1073.41	74387.13	6.174	11.63	805.88	0.067	1.09	75.88	0.0063
9	6.00	17.60	1.76	863.36	15195.11	1.520	15.40	271.06	0.027	3.48	61.30	0.0061
10	4.00	8.10	0.54	974.85	7896.26	0.529	24.89	201.62	0.014	0.82	6.67	0.0004
TOTAL FOR CYCLE			10.881			11.532			0.293			0.0136
TOTAL FOR CYCLE/LB FUEL						1.060			0.027			0.0012

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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:  176    ENGINE TYPE AND MODEL:  O-320-E2D              SERIAL NUMBER:   L-26284-27AB

                            RATED HORSEPOWER:   150.

     ENGINE TOTAL TIME:    426. HRS

     FUEL: AV GAS 80/87             FUEL H/C RATIO:    1.840

OPERATIONAL DATA ******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   81.50   FINISH   81.00

     ATMOSPHERIC PRESSURE:              START   30.16   FINISH   30.16

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.02

     RELATIVE HUMIDITY:                     72.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SE     1.60

NUMBER OF TESTS:  11

COMMENTS:



                   CARB.     TEST      ENGINE       MEASURED       MEASURED      CALCULATED
                  HEATER     MODE       RPM         FUEL FLOW      AIR FLOW         F/A
                                                     LB/HR          LB/HR

IDLE-LOW                      1         -0.0          5.60          74.00        0.06199
IDLE/TAXI                     2         -0.0          8.90         103.00        0.06692
RUN UP                        3         -0.0         26.40         322.00        0.06774
RUN UP-LEAN                   4         -0.0         26.40         322.00        0.06412
RUN UP-RICH                   5         -0.0         26.40         323.00        0.07040
TAKE-OFF                      6         -0.0         67.30         754.0C        0.08368
CLIMB                         7         -0.0         67.30         754.00        0.08368
DESCENT                       8         -0.0         38.30         493.00        0.07299
DESCENT            ON         8         -0.0         39.20         491.00        0.07501
APPROACH                      9         -0.0         17.60         212.00        0.07272
TAXI                         10         -0.0          7.20          89.00        0.06548


  TEST   EXHAUST    EXHAUST      CO        CO       THC       NO       NO       NO     ALDEHYDES   SMOKE    PARTICULATES
  MODE     GAS        GAS      (DRY)       2       (DRY)    (DRY)      2        X       (DRY)
          TEMP     PRESSURE  PERCENT V   (DRY)     PPMV     PPMV     (DRY)    (DRY)
        DEGREES F    PSIA              PERCENT V                      PPMV     PPMV

   1     348.00     -0.00      3.60      9.60   3018.00    29.00    -0.00    -0.00     18.00     -0.00       -0.00
   2     415.00     -0.00      7.00      7.10   2952.00    25.00    -0.00    -0.00     19.00     -0.00       -0.00
   3     818.00     -0.00      6.10      8.30   2559.00   217.00    -0.00    -0.00     -0.00     -0.00       -0.00
   4     717.00     -0.00      5.70      7.90   2493.00   103.00    -0.00    -0.00     -0.00     -0.00       -0.00
   5     863.00     -0.00      6.30      8.70   2559.00   115.00    -0.00    -0.00     -0.00     -0.00       -0.00
   6    1368.00     -0.00      9.70      8.10   2624.00    60.00    -0.00    -0.00     -0.00     -0.00       -0.00
   7    1368.00     -0.00      9.70      8.10   2624.00    60.00    -0.00    -0.00     10.00     -0.00       -0.00
   8    1166.00     -0.00      5.30     10.40   2427.00   451.00    -0.00    -0.00     16.00     -0.00       -0.00
   8    1155.00     -0.00      6.20      9.90   2427.00   495.00    -0.00    -0.00     11.00     -0.00       -0.00
   9     785.00     -0.00      6.80      8.70   2559.00   118.00    -0.00    -0.00     17.00     -0.00       -0.00
  10     516.00     -0.00      5.80      8.10   2559.00    37.00    -0.00    -0.00     20.00     -0.00       -0.00


  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC       NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1     538.66     25.86      0.0     2256.94     0.71      0.71   3016.48    144.83      0.0   12638.85      3.99      3.99
   2     982.39     23.73      0.0     1565.60     0.58      0.58   8743.23    211.17      0.0   13933.83      5.13      5.13
   3     840.85     20.20      0.0     1797.65     4.91      4.91  22198.45    533.35      0.0   47458.01    129.71    129.71
   4     831.47     20.83      0.0     1810.67     2.47      2.47  21950.91    549.85      0.0   47801.68     65.15     65.15
   5     834.27     19.41      0.0     1810.18     2.50      2.50  22024.61    512.37      0.0   47788.70     66.04     66.04
   6    1084.92     16.81      0.0     1423.47     1.10      1.10  73015.13   1131.23      0.0   95799.69     74.18     74.18
   7    1084.92     16.81      0.0     1423.47     1.10      1.10  73015.13   1131.23      0.0   95799.69     74.18     74.18
   8     671.61     17.61      0.0     2070.67     9.39      9.39  25722.56    674.61      0.0   79306.75    359.53    359.53
   8     766.43     17.18      0.0     1922.88    10.05     10.05  30043.85    673.56      0.0   75376.75    393.99    393.99
   9     871.90     18.79      0.0     1752.73     2.49      2.49  15345.46    330.74      0.0   30848.10     43.74     43.74
  10     827.74     20.92      0.0     1816.30     0.87      0.87   5959.70    150.60      0.0   13077.36      6.24      6.24


                                              LTO CYCLE EMISSIONS

  TEST   TIME IN   MEASURED    FUEL       CO        CO        CO        HC        HC        HC        NO        NO        NO
  MODE    MODE    FUEL FLOW    USED     LB/1K     LB/1K   EMISSION   LB/1K     LB/1K   EMISSION    LB/1K     LB/1K   EMISSION
          MIN.      LB/HR      LBS.    LB FUEL    HOURS     LBS.    LB FUEL    HOURS     LBS.     LB FUEL    HOURS     LBS.

   2     12.00      8.90      1.78     982.39   8743.23    1.749     23.73    211.17    0.042      0.58      5.13    0.0010
   6      0.30     67.30      0.34    1084.92  73015.13    0.365     16.81   1131.23    0.006      1.10     74.18    0.0004
   7      5.00     67.30      5.59    1084.92  73015.13    6.060     16.81   1131.23    0.[illegible]      1.10     74.18    0.0062
   9      6.00     17.60      1.76     871.90  15345.46    1.535     18.79    330.74    0.0[illegible]      2.49     43.74    0.0044
  10      4.00      7.20      0.48     827.74   5959.7C    0.399     2C.92    150.60    0.010      0.87      6.24    0.0004

 TOTAL FOR CYCLE              9.945                       10.108                        0.185                        0.0123

 TOTAL FOR CYCLE/LB FUEL                                   1.016                        0.019                        0.0012
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DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 177 ENGINE TYPE AND MODEL: O-320-E2D SERIAL NUMBER: L-26284-27AC

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 427. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 85.00 FINISH 85.50

ATMOSPHERIC PRESSURE: START 30.16 FINISH 30.15

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 66.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	5.60	72.00	0.05771
IDLF/TAXI		2	-0.0	8.90	100.00	0.06723
RUN UP		3	-0.0	27.30	332.00	0.06852
RUN UP-LEAN		4	-0.0	25.50	310.00	0.06186
RUN UP-RICH		5	-0.0	26.40	323.00	0.06630
TAKE-OFF		6	-0.0	69.30	768.00	0.08386
CLIMB		7	-0.0	69.30	768.00	0.08386
OFSCENT		8	-0.0	36.40	468.00	0.07296
DESCENT	ON	8	-0.0	39.20	488.00	0.07412
APPROACH		9	-0.0	17.60	211.00	0.07320
TAXI		10	-0.0	8.10	98.00	0.06605

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	280.00	-0.00	3.80	8.40	3012.00	24.00	-0.00	-0.00	19.00	-0.00	-0.00
2	359.00	-0.00	7.40	6.70	3338.00	17.00	-0.00	-0.00	15.00	-0.00	-0.00
3	740.00	-0.00	6.20	8.40	2307.00	199.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	673.00	-0.00	5.70	7.40	2307.00	100.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	785.00	-0.00	6.00	8.10	2307.00	110.00	-0.00	-0.00	-0.00	-0.0C	-0.00
6	1323.00	-0.00	10.00	7.80	2741.00	59.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1323.00	-0.00	10.00	7.80	2741.00	59.00	-0.00	-0.00	11.00	-0.00	-0.00
8	1110.00	-0.00	5.60	10.10	2144.00	444.00	-0.00	-0.00	9.00	-0.00	-0.00
8	1121.00	-0.00	6.40	9.50	2198.00	468.00	-0.00	-0.00	11.00	-0.00	-0.00
9	751.00	-0.00	7.00	8.60	2524.00	132.00	-0.00	-0.00	12.00	-0.00	-0.00
10	493.00	-0.00	6.10	7.90	2632.00	35.00	-0.00	-0.00	18.00	-0.00	-0.00

TEST MODE	MASS FMI CO LB/1K LB FUEL	MASS FMI HC LB/1K LB FUEL	MASS FMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HK	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	614.09	27.88	0.0	2132.89	0.64	0.64	3438.91	156.11	0.0	11944.16	3.57	3.57
2	1035.75	26.76	0.0	1473.45	0.39	0.39	9218.13	238.15	0.0	13113.66	3.48	3.48
3	844.56	18.00	0.0	1797.87	4.45	4.45	23056.55	491.35	0.0	49081.77	121.56	121.56
4	863.82	20.02	0.0	1762.05	2.49	2.49	22027.43	510.60	0.0	44932.34	63.48	63.48
5	845.83	18.63	0.0	1794.15	2.55	2.55	22330.03	491.73	0.0	47365.41	67.24	67.24
6	1117.75	17.55	0.0	1369.87	1.08	1.08	77460.06	1216.00	0.0	94931.56	75.07	75.07
7	1117.75	17.55	0.0	1369.87	1.08	1.08	77460.06	1216.00	0.0	94931.56	75.07	75.07
8	710.99	15.59	0.0	2014.52	9.26	9.26	25876.22	567.39	0.0	73328.44	336.99	336.99
8	802.09	15.78	0.0	1870.70	9.63	9.63	31441.85	616.45	0.0	73331.38	377.65	377.65
9	892.08	18.42	0.0	1722.04	2.76	2.76	1570C.64	324.23	0.0	30307.91	48.63	48.63
10	864.00	21.35	0.0	1758.13	0.81	0.81	6998.41	172.94	0.0	14240.82	6.60	6.60

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC L3/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	8.90	1.78	1035.75	9218.13	1.844	26.76	238.15	0.048	0.39	3.48	0.0007
6	0.30	69.30	0.35	1117.75	77460.06	0.387	17.55	1216.00	0.006	1.09	75.07	0.0004
7	5.00	69.30	5.75	1117.75	77460.06	6.429	17.55	1216.00	0.101	1.09	75.07	C.0062
9	6.00	17.60	1.76	892.08	15700.64	1.570	18.42	324.23	0.032	2.76	48.63	0.0049
10	4.00	8.10	0.54	864.00	6998.41	0.469	21.35	172.94	0.012	0.81	6.6C	0.0004
TOTAL FOR CYCLE			10.181			10.699			0.199			0.0126
TOTAL FOR CYCLE/LB FUEL						1.051			0.020			0.0012

DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 238 ENGINE TYPE AND MODEL: O-320-E3D SERIAL NUMBER: L-29465-27AA

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 54. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 79.00 FINISH 79.00

ATMOSPHERIC PRESSURE: START 29.70 FINISH 29.70

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 42.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARR. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	15.20	158.00	0.03596
IDLE/TAXI		2	-0.0	18.80	192.00	0.05723
RUN UP		3	-0.0	34.00	372.00	0.08167
RUN UP-LEAN		4	-0.0	31.60	351.00	0.08202
RUN UP-RICH		5	-0.0	31.60	349.0C	0.08159
TAKE-OFF		6	-0.0	75.00	802.00	0.08519
CLIMB		7	-0.0	75.00	802.00	0.08519
DESCENT		8	-0.0	41.00	470.00	0.08046
DESCENT	ON	8	-0.0	38.70	494.00	0.07346
APPROACH		9	-0.0	27.80	290.00	0.08432
TAXI		10	-0.0	18.80	216.00	0.05092

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	314.00	-0.00	4.20	2.90	4991.00	3.00	-0.00	-0.00	9.00	-0.00	-0.00
2	426.00	-0.00	7.40	4.30	4547.00	6.00	-0.00	-0.00	10.00	-0.00	-0.00
3	953.00	-0.00	9.90	7.40	2717.00	66.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	874.00	-0.00	9.70	7.70	2717.00	46.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1C09.00	-0.00	9.70	7.60	2717.00	46.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1256.00	-0.00	10.90	7.20	2052.00	41.00	-0.00	-0.00	7.00	-0.00	-0.00
7	1256.00	-0.00	10.90	7.20	2052.00	41.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1143.00	-0.00	8.90	8.30	1885.00	60.00	-0.00	-0.00	3.00	-0.00	-0.00
8	1177.00	-0.00	5.50	10.40	1442.00	482.00	-0.00	-0.00	8.00	-0.00	-0.00
9	896.00	-0.00	10.50	7.20	4215.00	44.00	-0.00	-0.00	6.00	-0.00	-0.00
10	437.00	-0.00	5.30	5.40	1775.00	21.00	-0.00	-0.00			

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LP/HR	MASS EMI NOX LB/HR
1	1116.58	75.99	0.0	1211.37	0.13	0.13	16971.97	1155.09	C.0	18412.78	1.99	1.99
2	1229.96	43.28	0.0	1122.96	0.16	0.16	23123.14	813.74	0.0	21111.62	3.08	3.08
3	1138.21	17.89	0.0	1336.77	1.25	1.25	38699.22	608.28	0.0	45450.32	42.38	42.38
4	1108.91	17.79	0.0	1383.10	0.86	0.86	35041.46	562.14	0.0	43705.81	27.30	27.30
5	1115.22	17.89	0.0	1372.90	0.87	0.87	35240.89	565.34	0.0	43383.68	27.45	27.45
6	1202.97	12.97	0.0	1248.53	0.74	0.74	90222.44	972.77	0.0	93639.56	55.74	55.74
7	1202.97	12.97	0.0	1248.53	0.74	0.74	90222.44	972.77	0.0	93639.56	55.74	55.74
8	1034.02	12.54	0.0	1515.15	1.15	1.15	42394.89	514.26	0.0	62121.20	46.95	46.95
8	692.54	10.40	0.0	2057.57	9.97	9.97	26801.39	402.44	0.0	79628.06	385.80	385.80
9	1170.57	26.91	0.0	1261.18	0.81	0.81	32541.79	748.16	0.0	35060.89	22.40	22.40
10	984.35	18.88	0.0	1575.81	0.64	0.64	18505.72	354.96	0.0	29625.27	12.04	12.04

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HCURS	NO EMISSION LBS.
2	12.00	18.80	3.76	1229.96	23123.14	4.625	43.28	813.74	0.163	0.16	3.08	0.0006
6	0.30	75.00	0.37	1202.97	90222.44	0.451	12.97	972.77	0.005	0.74	55.74	0.0003
7	5.00	75.00	6.22	1202.97	90222.44	7.488	12.97	972.77	0.081	0.74	55.74	0.0046
9	6.00	27.80	2.78	1170.57	32541.79	3.254	26.91	748.16	0.075	0.81	22.40	0.0022
10	4.00	18.80	1.26	984.35	18505.72	1.240	18.88	354.96	0.024	0.64	12.04	0.0008
TOTAL FOR CYCLF			14.400			17.058			0.347			0.0086
TOTAL FOR CYCLE/LB FUEL						1.185			0.024			0.0006

DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 239 ENGINE TYPE AND MODEL: O-320-E3D SERIAL NUMBER: L-29465-27AB

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 55. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 82.00 FINISH 82.00

ATMOSPHERIC PRESSURE: START 29.70 FINISH 29.70

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 43.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	15.20	181.00	0.03331
IDLE/TAXI		2	-0.0	18.80	212.00	0.05306
RUN UP		3	-0.0	32.80	360.00	0.08264
RUN UP-LEAN		4	-0.0	32.80	362.00	0.08190
RUN UP-RICH		5	-0.0	31.60	350.00	0.08256
TAKE-OFF		6	-0.0	72.70	785.00	0.08597
CLIMB		7	-0.0	72.70	785.00	0.08597
DESCENT		8	-0.0	43.40	500.00	0.08041
DESCENT	ON	8	-0.0	39.80	508.00	0.07440
APPROACH		9	-0.0	23.40	252.00	0.08387
TAXI		10	-0.0	17.60	204.00	0.04903

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	269.00	-0.00	3.10	3.80	1709.00	9.00	-0.00	-0.00	7.00	-0.00	-0.00
2	381.00	-0.00	5.80	5.30	2269.00	16.00	-0.00	-0.00	8.00	-0.00	-0.00
3	953.00	-0.00	10.00	7.50	2885.00	71.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	886.00	-0.00	9.70	7.60	3389.00	56.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1009.00	-0.00	9.80	7.70	2885.00	55.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1278.00	-0.00	10.80	7.50	1989.00	68.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1278.00	-0.00	10.80	7.50	1989.00	68.00	-0.00	-0.00	11.00	-0.00	-0.00
8	1155.00	-0.00	8.70	8.50	1933.00	78.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1177.00	-0.00	5.70	10.40	1485.00	508.00	-0.00	-0.00	6.00	-0.00	-0.00
9	897.00	-0.00	10.50	7.10	4174.00	48.00	-0.00	-0.00	9.00	-0.00	-0.00
10	415.00	-0.00	5.00	5.30	1709.00	22.00	-0.00	-0.00	8.00	-0.30	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	885.70	27.96	0.0	1705.88	0.42	0.42	13462.71	425.07	0.0	25929.39	6.42	6.42
2	1034.47	23.18	0.0	1485.27	0.47	0.47	19448.06	435.74	0.0	27923.02	8.81	8.81
3	1135.70	18.77	0.0	1338.33	1.32	1.32	37250.84	615.50	0.0	43897.08	43.44	43.44
4	1110.97	22.23	0.0	1367.67	1.05	1.05	36439.79	729.16	0.0	44859.62	34.56	34.56
5	1112.98	18.77	0.0	1374.01	1.03	1.03	35170.25	592.98	0.0	43418.84	32.42	32.42
6	1179.45	12.44	0.0	1286.93	1.22	1.22	85745.94	904.42	0.0	93559.81	88.68	88.68
7	1179.45	12.44	0.0	1286.93	1.22	1.22	85745.94	904.42	0.0	93559.81	88.68	88.68
8	1010.51	12.86	0.0	1551.23	1.49	1.49	43855.97	558.07	0.0	67323.44	64.58	64.58
8	708.70	10.57	0.0	2031.70	10.37	10.37	28206.31	420.87	0.0	80861.69	412.91	412.91
9	1177.33	26.80	0.0	1250.85	0.88	0.88	27549.56	627.22	0.0	29269.94	20.69	20.69
10	964.69	18.88	0.0	1606.69	0.70	0.70	16978.53	332.37	0.0	28277.71	12.27	12.27

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	18.80	3.76	1034.47	19448.06	3.890	23.18	435.74	0.087	0.47	8.81	0.0018
6	0.30	72.70	0.36	1179.45	85745.94	0.429	12.44	904.42	0.005	1.72	83.68	0.0004
7	5.00	72.70	6.03	1179.45	85745.94	7.117	12.44	904.42	0.075	1.22	83.68	0.0074
9	6.00	23.40	2.34	1177.33	27549.56	2.755	26.80	627.22	0.063	0.88	20.69	0.0021
10	4.00	17.60	1.18	964.69	16978.53	1.138	18.88	332.37	0.022	0.70	12.27	0.0008
TOTAL FOR CYCLE			13.677			15.328			0.252			0.0125
TOTAL FOR CYCLE/LB FUEL						1.121			0.018			0.0009

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DATE:   7/28/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ****************************************************************************************.************************

     CAL ID NUMBER:  240    ENGINE TYPE AND MODEL:  O-320-E3D                    SERIAL NUMBER:   L-29465-27AC

                            RATED HORSEPOWER:   150.

     ENGINE TOTAL TIME:     55. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840
**************************************************************************************************************************
OPERATIONAL DATA **********************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   78.00   FINISH   78.00

     ATMOSPHERIC PRESSURE:              START   29.70   FINISH   29.70

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     40.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

  NUMBER OF TESTS:  11

  COMMENTS:



                    CARB.     TEST      ENGINE        MEASURED       MEASURED      CALCULATED
                    HEATER    MODE       RPM          FUEL FLOW      AIR FLOW         F/A
                                                        LB/HR          LB/HR

  IDLE-LOW                     1        -0.0           16.40         198.00        0.03274
  IDLE/TAXI                    2        -0.0           19.90         225.00        0.05772
  RUN UP                       3        -0.0           32.80         360.00        0.08132
  RUN UP-LEAN                  4        -0.0           32.80         363.00        0.08065
  RUN UP-RICH                  5        -0.0           31.60         350.00        0.08042
  TAKE-OFF                     6        -0.0           75.00         813.00        0.08282
  CLIMB                        7        -0.0           75.00         813.00        0.08282
  DESCENT                      8        -0.0           44.50         517.00        0.07814
  DESCENT           ON         8        -0.0           39.80         506.00        0.07315
  APPROACH                     9        -0.0           27.00         287.00        0.08373
  TAXI                        10        -0.0           18.80         220.00        0.04848


   TEST   EXHAUST    EXHAUST      CO        CO        THC       NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
   MODE     GAS        GAS       (DRY)       2       (DRY)     (DRY)       2         X       (DRY)
           TEMP      PRESSURE  PERCENT V  (DRY)      PPMV      PPMV     (DRY)     (DRY)
         DEGREES F     PSIA              PERCENT V                       PPMV      PPMV

    1     258.00      -0.00       2.90      3.90   1537.00      9.00     -C.00     -0.00       7.00      -0.00       -0.00
    2     415.00      -0.00       6.40      5.70   2416.00     18.00     -0.00     -0.00       6.00      -0.00       -0.00
    3     874.00      -0.00       9.80      7.40   2965.00     66.00     -0.00     -0.00      -0.00      -0.00       -0.00
    4     830.00      -0.00       9.50      7.50   3623.00     -0.00     -0.00     -0.00      -0.00      -0.00       -0.00
    5     942.00      -0.00       9.50      7.50   3129.00     47.00     -0.00     -0.00      -0.00      -0.00       -0.00
    6    1278.00      -0.00      10.30      7.30   2086.00     27.00     -0.00     -0.00      -0.00      -0.00       -0.00
    7    1278.00      -0.00      10.30      7.30   2086.00     27.00     -0.00     -0.00       7.00      -0.00       -0.00
    8    1188.00      -0.00       8.30      8.40   1976.00     73.00     -0.00     -0.00       7.00      -0.00       -0.00
    8    1166.00      -0.00       5.70     10.10   1537.00    443.00     -0.00     -0.00       6.00      -0.00       -0.00
    9     919.00      -0.00      10.60      7.00   3788.00     43.00     -0.00     -0.00      10.00      -0.00       -0.00
   10     448.00      -0.00       4.80      5.40   1592.00     22.00     -0.00     -0.00       5.00      -0.30       -0.00


   TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
   MODE      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUFL

    1      842.53     25.57       0.0      1780.28     0.43       0.43   13817.43     419.42       0.0    29196.61      7.04       7.04
    2     1047.64     22.65       0.0      1466.03     0.48       0.48   20847.93     450.74       0.0    29174.02      9.63       9.63
    3     1131.56     19.61       0.0      1342.52     1.25       1.25   37115.08     643.12       0.0    44034.62     41.06      41.06
    4     1105.40     24.14       0.0      1371.18    -0.00      -0.00   36257.00     791.92       0.0    44974.64     -0.00      -0.00
    5     1108.55     20.91       0.0      1375.09     0.90       0.90   35030.20     660.80       0.0    43452.86     28.47      28.47
    6     1168.45     13.55       0.0      1301.17     0.50       0.50   87633.56    1016.47       0.0    97587.50     37.73      37.73
    7     1168.45     13.55       0.0      1301.17     0.50       0.50   87633.56    1016.47       0.0    97587.50     37.73      37.73
    8      992.33     13.53       0.0      1577.95     1.43       1.43   44158.55     602.10       0.0    70218.94     63.79      63.79
    8      721.80     11.15       0.0      2009.56     9.21       9.21   28727.52     443.65       0.0    79980.25    366.73     366.73
    9     1191.10     24.38       0.0      1235.88     0.79       0.79   32159.61     658.20       0.0    33368.83     21.43      21.43
   10      936.09     17.78       0.0      1654.66     0.70       0.79   17598.43     334.29       0.0    31107.51     13.25      13.25


                                                        LTO CYCLE EMISSIONS

   TEST    TIME IN    MEASURED     FUEL        CO          CO          CO         HC         HC         HC         NO         NO         NO
   MODF     MODE     FUEL FLOW     USED       LB/1K       LB/1K     EMISSION     LB/1K      LB/1K    EMISSION     LB/1K      LB/1K    EMISSION
            MIN.       LB/HR       LBS.      LB FUEL      HOURS       LBS.      LB FUEL     HOURS      LBS.      LB FUEL     HOURS      LBS.

    2      12.00      19.90        3.98     1047.64    20847.93      4.170      22.65     450.74      0.090      0.48        9.63     0.0019
    6       0.30      75.00        0.37     1168.45    87633.56      0.438      13.55    1016.47      0.005      0.50       37.73     0.0002
    7       5.00      75.00        6.22     1168.45    87633.56      7.274      13.55    1016.47      0.084      0.50       37.73     0.0031
    9       6.00      27.00        2.70     1191.10    32159.61      3.216      24.38     658.20      0.066      0.79       21.43     0.0021
   10       4.00      18.80        1.26      936.09    17598.43      1.179      17.78     334.29      0.022      0.70       13.25     0.0009

   TOTAL FOR CYCLE                14.540                            16.276                           0.268                           0.0083

   TOTAL FOR CYCLE/LB FUEL                                           1.119                           0.018                           C.0006
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DATE:   7/30/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:  226    ENGINE TYPE AND MODEL:  IO-360-A/B              SERIAL NUMBER:   L-6967-51AA

                            RATED HORSEPOWER:   200.

     ENGINE TOTAL TIME:     62. HRS

     FUEL: AV GAS 100/130          FUEL H/C RATIO:    1.840
OPERATIONAL DATA ******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    77.50   FINISH   80.00

     ATMOSPHERIC PRESSURE:              START    30.10   FINISH   30.10

     INLET AIR HUMIDITY, GRN H2O/LB AIR:      0.01

     RELATIVE HUMIDITY:                      51.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:   8

 COMMENTS:



                    CARB.    TEST     ENGINE      MEASURED       MEASURED      CALCULATED
                    HEATER   MODE      RPM        FUEL FLOW      AIR FLOW         F/A
                                                   LB/HR          LB/HR

IDLE-LOW                      1        -0.0        16.40         170.00         0.06413
IDLE/TAXI                     2        -0.0        17.60         222.00         0.05427
RUN UP                        3        -0.0        46.90         562.00         0.06980
TAKE-OFF                      6        -0.0        91.40        1026.00         0.08125
CLIMB                         7        -0.0        70.30         788.00         0.07946
DESCENT                       8        -0.0        62.10         686.00         0.08059
APPROACH                      9        -0.0        48.10         531.00         0.08070
TAXI                         10        -0.0        18.80         197.00         0.07075

                                                                                  ALDEHYDES    SMOKE     PARTICULATES
  TEST   EXHAUST    EXHAUST      CO         CO       THC        NO        NO        NO      (DRY)
  MODE     GAS        GAS       (DRY)        2      (DRY)     (DRY)       2         X
           TEMP     PRESSURE  PERCENT V   (DRY)     PPMV      PPMV      (DRY)     (DRY)
         DEGREES F    PSIA              PERCENT V                        PPMV      PPMV

   1      -0.00      -0.00       6.90      5.70  11094.00    -0.00     -0.00     -0.00      7.00     -0.00       -0.00
   2      -0.00      -0.00       4.00      7.40   3031.00    -0.00     -0.00     -0.00      7.00     -0.00       -0.00
   3      -0.00      -0.00       6.60      8.20   2910.00   209.00     -0.00     -0.00     -0.00     -0.00       -0.00
   6      -0.00      -0.00       9.40      7.90   2243.00   125.00     -0.00     -0.00     -0.00     -0.00       -0.00
   7      -0.00      -0.00       9.20      7.70   2243.00   150.00     -0.00     -0.00      5.00     -0.00       -0.00
   8      -0.00      -0.00       9.60      7.50   2486.00   146.00     -0.00     -0.00      5.00     -0.00       -0.00
   9      -0.00      -0.00       9.60      7.50   2728.00   149.00     -0.00     -0.00      5.00     -0.00       -0.00
  10      -0.00      -0.00       8.90      5.60   6062.00    -0.00     -0.00     -0.00      9.00     -0.00       -0.00

  TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE       CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
           LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
          LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1      1016.79    93.63      0.0     1319.77    -0.00     -0.00  16675.38   1535.54     0.0   21644.13     -0.00     -0.00
   2       690.50    29.97      0.0     2007.11    -0.00     -0.00  12152.71    527.41     0.0   35325.10     -0.00     -0.00
   3       883.54    22.31      0.0     1724.79     4.60      4.60  41438.17   1046.39     0.0   80892.56    215.54    215.54
   6      1083.65    14.81      0.0     1430.96     2.37      2.37  99045.56   1353.57     0.0  130789.38    216.34    216.34
   7      1085.37    15.16      0.0     1427.31     2.91      2.91  76301.31   1065.41     0.0  100339.81    204.34    204.34
   8      1117.91    16.58      0.0     1372.26     2.79      2.79  69422.44   1029.62     0.0   85217.44    173.42    173.42
   9      1116.36    18.17      0.0     1370.35     2.85      2.85  53696.78    873.91     0.0   65913.81    136.89    136.89
  10      1190.25    46.43      0.0     1176.72    -0.00     -0.00  22376.60    872.90     0.0   22122.31     -0.00     -0.00

                                             LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL      CO         CO        CO        HC        HC        HC        NO        NO        NO
  MODE     MODE     FUEL FLOW   USED     LB/1K      LB/1K   EMISSION    LB/1K     LB/1K   EMISSION    LB/1K     LB/1K   EMISSION
           MIN.      LB/HR      LBS.    LB FUEL     HOURS     LBS.     LB FUEL    HOURS     LBS.     LB FUEL    HOURS     LBS.

   2      12.00      17.60      3.52     690.50   12152.71    2.431     29.97    527.41    0.105     -0.00     -0.00   -0.0000
   6       0.30      91.40      0.46    1083.65   99045.56    0.495     14.81   1353.57    0.007      2.37    216.34    0.0011
   7       5.00      70.30      5.83    1085.37   76301.31    6.333     15.16   1065.41    0.088      2.91    204.34    0.0170
   9       6.00      48.10      4.81    1116.36   53696.78    5.370     18.17    873.91    0.087      2.85    136.89    0.0137
  10       4.00      18.80      1.26    1190.25   22376.60    1.499     46.43    872.90    0.058     -0.00     -0.00   -0.0000

TOTAL FOR CYCLE                15.881                        16.128                        0.347                      -0.0000

TOTAL FOR CYCLE/LB FUEL                                       1.016                        0.022                      -0.0000
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DATE:   7/30/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  227    ENGINE TYPE AND MODEL:  IO-360-A/B              SERIAL NUMBER:   L-6967-51AB

                            RATED HORSEPOWER:   200.

     ENGINE TOTAL TIME:     62. HRS

     FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840

OPERATIONAL DATA *************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   80.50   FINISH   80.50

     ATMOSPHERIC PRESSURE:              START   30.12   FINISH   30.12

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     49.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:   8

COMMENTS:



                   CARB.     TEST      ENGINE      MEASURED       MEASURED      CALCULATED
                   HEATER    MODE       RPM        FUEL FLOW      AIR FLOW         F/A
                                                    LB/HR          LB/HR

IDLE-LOW                       1        -0.0        12.90          131.00        0.06720
IDLE/TAXI                      2        -0.0        18.80          230.00        0.06618
RUN UP                         3        -0.0        44.50          502.00        0.07622
TAKE-OFF                       6        -0.0        93.80         1024.00        0.08427
CLIMB                          7        -0.0        71.50          777.00        0.08339
DESCENT                        8        -0.0        64.50          704.00        0.08340
APPROACH                       9        -0.0        44.50          484.00        0.08268
TAXI                          10        -0.0        17.60          165.00        0.08982


 TEST    EXHAUST     EXHAUST       CO          CO        THC        NO        NO         NO      ALDEHYDES    SMOKE     PARTICULATES
 MODE      GAS         GAS        (DRY)         2       (DRY)      (DRY)       2          X        (DRY)
          TEMP      PRESSURE   PERCENT V     (DRY)      PPMV       PPMV      (DRY)      (DRY)
        DEGREES F     PSIA                 PERCENT V                         PPMV       PPMV

   1     -0.00       -0.00        6.10        6.30  20079.00     47.00     -0.00      -0.00      23.00      -0.00         -0.00
   2     -0.00       -0.00        5.30        8.40   6286.00    150.00     -0.00      -0.00      14.00      -0.00         -0.00
   3     -0.00       -0.00        8.60        7.50   3143.00    160.00     -0.00      -0.00      -0.00      -0.00         -0.00
   6     -0.00       -0.00       10.30        7.60   2444.00     69.00     -0.00      -0.00      -0.00      -0.00         -0.00
   7     -0.00       -0.00       10.30        7.40   2386.00    100.00     -0.00      -0.00      10.00      -0.00         -0.00
   8     -0.00       -0.00       10.20        7.50   2503.00    121.00     -0.00      -0.00       7.00      -0.00         -0.00
   9     -0.00       -0.00       10.20        7.30   2794.00    123.00     -0.00      -0.00       4.00      -0.00         -0.00
  10     -0.00       -0.00       11.50        6.00  16936.00     44.00     -0.00      -0.00      12.00      -0.00         -0.00


 TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1      855.32     161.25       0.0     1387.97       1.08       1.08   11033.69    2080.07       0.0    17904.80      13.96      13.96
   2      747.26      50.76       0.0     1860.87       3.47       3.47   14048.54     954.28       0.0    34984.31      65.31      65.31
   3     1058.47      22.15       0.0     1450.37       3.23       3.23   47101.85     985.89       0.0    64541.46     143.94     143.94
   6     1146.82      15.58       0.0     1329.57       1.26       1.26  107571.94    1461.87       0.0   124713.50     118.37     118.37
   7     1159.98      15.39       0.0     1309.43       1.85       1.85   82938.50    1100.36       0.0    93624.38     132.26     132.26
   8     1147.97      16.13       0.0     1326.26       2.24       2.24   74044.00    1040.63       0.0    85543.86     144.28     144.28
   9     1159.00      18.18       0.0     1303.30       2.30       2.30   51575.68     809.13       0.0    57997.01     102.16     102.16
  10     1210.44     102.09       0.0      992.28       0.76       0.76   21303.72    1796.86       0.0    17464.14      13.39      13.39


                                                       LTO CYCLE EMISSIONS

 TEST    TIME IN   MEASURED     FUEL        CO         CO          CO         HC         HC         HC         NO         NO         NO
 MODE      MODE    FUEL FLOW    USED      LB/1K      LB/1K     EMISSION     LB/1K      LB/1K    EMISSION     LB/1K      LB/1K    EMISSION
           MIN.      LB/HR      LBS.     LB FUEL     HOURS       LBS.      LB FUEL     HOURS      LBS.      LB FUEL     HOURS      LBS.

   2      12.00      18.80      3.76      747.26    14048.54     2.810      50.76      954.28     0.191       3.47      65.31     0.0131
   6       0.30      93.80      0.47     1146.82   107571.94     0.538      15.58     1461.87     0.007       1.26     118.37     0.0006
   7       5.00      71.50      5.93     1159.98    82938.50     6.884      15.39     1100.36     0.091       1.85     132.26     0.0110
   9       6.00      44.50      4.45     1159.00    51575.68     5.158      18.18      809.13     0.081       2.30     102.16     0.0102
  10       4.00      17.60      1.18     1210.44    21303.72     1.427     102.09     1796.86     0.120       0.76      13.39     0.0009

TOTAL FOR CYCLE                15.793                           16.816                           0.491                            0.0357

TOTAL FOR CYCLE/LB FUEL                                          1.065                           0.031                            0.0023
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DATE:   7/30/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ******************************************************************************************

    CAL ID NUMBER:  228    ENGINE TYPE AND MODEL:  IO-360-A/B            SERIAL NUMBER:   L-6967-51AC

                           RATED HORSEPOWER:   200.

    ENGINE TOTAL TIME:     63. HRS

    FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA *************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   85.50   FINISH   87.00

    ATMOSPHERIC PRESSURE:              START   30.10   FINISH   30.10

    INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

    RELATIVE HUMIDITY:                     40.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

    SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:   6

COMMENTS:



                   CARB.    TEST     ENGINE     MEASURED     MEASURED      CALCULATED
                  HEATER    MODE      RPM      FUEL FLOW     AIR FLOW         F/A
                                                 LB/HR        LB/HR

IDLE-LOW                     1       -0.0        16.40        182.00        0.07104
IDLE/TAXI                    2       -0.0        17.60        200.00        0.07382
RUN UP                       3       -0.0        46.90        549.00        0.07522
TAKE-OFF                     6       -0.0       105.50       1146.00        0.08801
CLIMB                        7       -0.0        73.80        810.00        0.08507
DESCENT                      8       -0.0        64.50        708.00        0.08510
APPROACH                     9       -0.0        46.90        513.00        0.08484
TAXI                        10       -0.0        18.80        182.00        0.08262


 TEST   EXHAUST    EXHAUST       CO        CO        THC       NO        NO        NO     ALDEHYDES    SMOKE     PARTICULATES
 MODE     GAS        GAS        (DRY)       2       (DRY)     (DRY)       2         X       (DRY)
         TEMP     PRESSURE   PERCENT V   (DRY)      PPMV      PPMV     (DRY)     (DRY)
       DEGREES F    PSIA               PERCENT V                        PPMV      PPMV

  1     426.00     -0.00       6.90      7.40   10028.00     46.00    -0.00     -0.00     15.00      -0.00       -0.00
  2     471.00     -0.00       7.80      7.50    6029.00     58.00    -0.00     -0.00      6.00      -0.00       -0.00
  3     930.00     -0.00       7.70      8.30    2626.00     -0.00    -0.00     -0.00     -0.00      -0.00       -0.00
  6    1211.00     -0.00      10.90    • 7.80    2626.00    149.00    -0.00     -0.00     -0.00      -0.00       -0.00
  7    1267.00     -0.00      10.30      7.80    2328.00    142.00    -0.00     -0.00      5.00      -0.00       -0.00
  8    1233.00     -0.00      10.30      7.80    2388.00    149.00    -0.00     -0.00      9.00      -0.00       -0.00
  9    1076.00     -0.00      10.30      7.70    2746.00    152.00    -0.00     -0.00      8.00      -0.00       -0.00
 10     538.00     -0.00       9.60      6.30   17908.00    132.00    -0.00     -0.00     27.00      -0.00       -0.00


 TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI   MASS EMI  MASS EMI  MASS EMI   MASS EMI  MASS EMI
 MODE      CO        HC        NO2       CO2       NO        NOX        CO         HC        NO2       CO2        NO        NOX
         LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR      LB/HR     LB/HR     LB/HR      LB/HR     LB/HR
        LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  1     910.92     75.82      0.0    1534.97      1.00      1.00   14939.07   1243.47      0.0    25173.54     16.36     16.36
  2     990.88     43.86      0.0    1497.01      1.21      1.21   17439.44    772.02      0.0    26347.36     21.30     21.30
  3     956.54     18.68      0.0    1620.05     -0.00     -0.00   44861.66    876.24      0.0    75980.25     -0.00     -0.00
  6    1161.26     16.02      0.0    1305.68      2.61      2.61  122513.13   1690.43      0.0   137749.19    275.08    275.08
  7    1135.04     14.69      0.0    1350.54      2.57      2.57   83765.75   1084.32      0.0    99669.44    189.69    189.69
  8    1134.67     15.07      0.0    1350.09      2.70      2.70   73185.94    971.78      0.0    87080.94    173.90    173.90
  9    1138.65     17.39      0.0    1337.47      2.76      2.76   53402.79    815.40      0.0    62727.17    129.45    129.45
 10    1096.29    117.12      0.0    1130.40      2.48      2.48   20610.24   2201.93      0.0    21251.55     46.55     46.55


                                                 LTO CYCLE EMISSIONS

 TEST   TIME IN  MEASURED    FUEL      CO         CO        CO        HC        HC        HC        NO        NO        NO
 MODE    MODE    FUEL FLOW   USED     LB/1K      LB/1K   EMISSION    LB/1K     LB/1K   EMISSION    LB/1K     LB/1K   EMISSION
         MIN.      LB/HR     LBS.    LB FUEL     HOURS     LBS.     LB FUEL    HOURS     LBS.     LB FUEL    HOURS     LBS.

  2     12.00      17.60     3.52    990.88   17439.44    3.488     43.86     772.02    0.154      1.21      21.30    0.0043
  6      0.30     105.50     0.53   1161.26  122513.13    0.613     16.02    1690.43    0.008      2.61     275.08    0.0014
  7      5.00      73.80     6.13   1135.04   83765.75    6.953     14.69    1084.32    0.090      2.57     189.69    0.0157
  9      6.00      46.90     4.69   1138.65   53402.79    5.340     17.39     815.40    0.082      2.76     129.45    0.0129
 10      4.00      18.80     1.26   1096.29   20610.24    1.381    117.12    2201.93    0.148      2.48      46.55    0.0031

                                                                                     0.482                        0.0374
TOTAL FOR CYCLE              16.122                      17.774

                                                                                     0.030                        0.0023
TOTAL FOR CYCLE/LB FUEL                                   1.102
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DATE: 8/ 6/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

FNGINE DATA **

CAL ID NUMBER: 271 ENGINE TYPE AND MODEL: IO-360-A1A SERIAL NUMBER: L-2928-51AA

RATED HORSEPOWER: 200.

ENGINE TOTAL TIME: 1023. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 89.00 FINISH 89.00

ATMOSPHERIC PRESSURE: ST..AT 30.20 FINISH 30.20

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 36.00 PERCENT

SAMPLE LINE: TEMPERATURE, CEGREES C: -0.0C, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MUDE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURFD AIR FLOW LB/HR	CALCULATFD F/A
IDLE-LOW		1	-0.0	5.90	58.0C	0.C5994
IDLF/TAXI		2	-0.0	9.40	96.00	0.06673
RUN UP		3	-0.0	27.00	324.00	0.06985
RUN UP-LEAN		4	-0.0	27.00	323.00	0.06988
RUN UP-RICH		5	-0.0	27.00	323.00	0.06988
TAKE-OFF		6	-0.0	98.40	1060.00	0.07696
CLIMR		7	-0.0	70.30	778.00	0.07541
DESCENT		8	-0.0	58.60	646.00	0.07407
APPROACH		9	-0.0	31.60	371.00	0.07092
TAXI		10	-0.0	9.40	94.00	0.06544

TEST MODE	FXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	448.00	-0.00	8.80	3.90	-0.00	6.00	-C.00	-0.00	66.00	-0.00	-0.00
2	560.00	-0.00	9.30	4.90	-0.00	-0.00	-0.00	-0.00	45.00	-0.00	-0.00
3	1031.00	-0.00	6.90	8.20	-0.00	448.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	998.00	-0.00	7.00	8.10	-0.00	303.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1031.00	-0.00	7.00	8.10	-0.00	242.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1233.00	-0.00	9.90	6.60	-0.00	139.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1233.00	-0.00	9.20	7.00	-0.00	193.00	-0.00	-0.00	18.00	-0.00	-0.00
8	1188.00	-0.00	9.10	6.80	-0.00	218.00	-0.00	-0.00	12.00	-0.00	-0.00
9	1076.00	-0.00	7.50	7.80	-0.00	402.00	-0.00	-0.00	15.00	-0.00	-0.00
10	673.00	-0.00	9.40	4.50	-0.00	113.00	-0.00	-0.00	26.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	1399.85	-0.00	0.0	974.77	0.16	0.16	8259.10	-0.00	0.0	5751.13	0.92	0.92
2	1323.11	-0.00	0.0	1095.34	-0.00	-0.00	12437.25	-0.00	0.0	10296.17	-0.00	-0.00
3	923.15	-0.00	0.0	1723.76	9.85	9.85	24925.14	-0.00	0.0	46541.55	265.82	265.82
4	936.53	-0.0C	0.0	1702.74	6.66	6.66	25286.38	-0.00	0.0	45973.95	179.78	179.78
5	936.53	-0.00	0.0	1702.74	5.32	5.32	25286.38	-0.00	0.0	45973.95	143.59	143.59
6	1212.14	-0.00	0.0	1269.70	2.80	2.80	119274.56	-0.00	0.0	124938.13	275.07	275.07
7	1147.29	-0.00	0.0	1371.59	3.95	3.95	80654.69	-0.00	0.0	96422.44	277.92	277.92
8	1156.24	-0.00	0.0	1357.54	4.55	4.55	67755.31	-0.00	0.0	79551.63	266.61	266.61
9	990.31	-0.00	0.0	1618.24	8.72	8.72	31293.82	-0.00	0.0	51136.38	275.51	275.51
10	1366.20	-0.00	0.0	1027.63	2.70	2.70	12842.30	-0.00	0.0	9659.74	25.36	25.36

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LD FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	9.40	1.88	1323.11	12437.25	2.487	-0.00	-0.00	-0.000	-0.00	-0.00	-0.0000
6	0.30	98.40	0.49	1212.14	119274.56	0.596	-0.00	-0.00	-0.000	2.80	275.07	0.0014
7	5.00	70.30	5.83	1147.29	80654.69	6.694	-0.00	-0.00	-0.000	3.95	277.92	0.0231
9	6.00	31.60	3.16	990.31	31293.82	3.129	-0.00	-0.00	-0.000	8.72	275.51	0.0276
10	4.00	9.40	0.63	1366.20	12842.30	0.860	-0.00	-0.00	-0.000	2.70	25.36	0.0017
TOTAL FOR CYCLE			11.997			13.768			-0.000			-0.0000
TOTAL FOR CYCLE/LB FUEL						1.148			-0.000			-0.0000

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DATE:   8/ 6/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:  272     ENGINE TYPE AND MODEL:  IO-360-A1A               SERIAL NUMBER:   L-2928-51AB

                             RATED HORSEPOWER:   200.

     ENGINE TOTAL TIME:   1023. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA *******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    78.00   FINISH   78.00

     ATMOSPHERIC PRESSURE:              START    30.18   FINISH   30.18

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.02

     RELATIVE HUMIDITY:                     77.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  10

COMMENTS:



                      CARB.    TEST     ENGINE      MEASURED     MEASURED     CALCULATED
                      HEATER   MODE      RPM        FUEL FLOW    AIR FLOW        F/A
                                                      LB/HR        LB/HR

IDLE-LOW                         1       -0.0          4.70        36.00       0.08078
IDLE/TAXI                        2       -0.0          8.20        79.00       0.07161
RUN UP                           3       -0.0         30.50       373.00       0.06684
RUN UP-LEAN                      4       -0.0         30.50       374.00       0.06638
RUN UP-RICH                      5       -0.0         30.50       373.00       0.06715
TAKE-OFF                         6       -0.0         93.80      1036.00       0.07649
CLIMB                            7       -0.0         70.30       774.00       0.07650
DESCENT                          8       -0.0         58.60       660.00       0.07140
APPROACH                         9       -0.0         29.30       340.00       0.06900
TAXI                            10       -0.0          8.20        62.00       0.08129


  TEST   EXHAUST    EXHAUST      CO         CO        THC        NO         NO         NO      ALDEHYDES    SMOKE     PARTICULATES
  MODE     GAS        GAS       (DRY)        2       (DRY)      (DRY)        2          X        (DRY)
          TEMP     PRESSURE   PERCENT V   (DRY)      PPMV       PPMV       (DRY)      (DRY)
        DEGREES F    PSIA               PERCENT V                          PPMV       PPMV

   1    549.00      -0.00       8.80       4.30  40464.00       6.00      -0.00      -0.00      38.00      -0.00        -0.00
   2    583.00      -0.00       8.60       5.30  13711.00      17.00      -0.00      -0.00      30.00      -0.00        -0.00
   3   1087.00      -0.00       5.90       8.30   2620.00     378.00      -0.00      -0.00      -0.00      -0.00        -0.00
   4   1065.00      -0.00       5.80       8.30   2620.00     243.00      -0.00      -0.00      -0.00      -0.00        -0.00
   5   1110.00      -0.00       5.90       8.40   2341.00     210.00      -0.00      -0.00      -0.00      -0.00        -0.00
   6   1233.00      -0.00       9.10       7.10   2397.00 [illegible]5.00 -0.00      -0.00      -0.00      -0.00        -0.00
   7   1244.00      -0.00       9.20       7.00   2341.00 [illegible]3.00 -0.00      -0.00      12.00      -0.00        -0.00
   8   1199.00      -0.00       9.10       7.00   2452.00     173.00      -0.00      -0.00      10.00      -0.00        -0.00
   9   1054.00      -0.00       7.20       7.40   2620.00     239.00      -0.00      -0.00      10.00      -0.00        -0.00
  10    673.00      -0.00       8.80       4.20  42471.00      47.00      -0.00      -0.00      34.00      -0.00        -0.00


  TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE      CO         HC        NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1    1036.84     273.05       0.0      796.04       0.12       0.12    4873.14    1283.34       0.0     3741.39       0.55       0.55
   2    1137.71     103.88       0.0     1101.66       0.37       0.37    9329.18     851.84       0.0     9033.57       3.03       3.03
   3     824.19      20.96       0.0     1821.75       8.67       8.67   25137.68     639.32       0.0    55563.50     264.54     264.54
   4     815.86      21.11       0.0     1834.44       5.61       5.61   24883.68     643.77       0.0    55950.36     171.24     171.24
   5     820.10      18.64       0.0     1834.56       4.79       4.79   25012.97     568.41       0.0    55954.01     146.24     146.24
   6    1118.28      16.87       0.0     1370.90       3.33       3.33  104894.31    1582.43       0.0   128589.88     312.40     312.40
   7    1130.95      16.48       0.0     1352.05       3.29       3.29   79505.81    1158.66       0.0    95048.88     231.38     231.38
   8    1066.39      18.49       0.0     1447.99       3.74       3.74   62490.20    1083.41       0.0    84852.13     219.23     219.23
   9     978.72      20.40       0.0     1580.50       5.34       5.34   28676.38     597.64       0.0    46308.64     156.35     156.35
  10    1030.79     284.92       0.0      772.99       0.90       0.90    8452.44    2336.35       0.0     6338.50       7.42       7.42


                                                      LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED     FUEL        CO          CO         CO         HC         HC         HC         NO         NO         NO
  MODE     MODE     FUEL FLOW    USED       LB/1K      LB/1K     EMISSION     LB/1K      LB/1K    EMISSION     LB/1K      LB/1K    EMISSION
           MIN.      LB/HR       LBS.      LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.

   2      12.00       8.20       1.64     1137.71     9329.18     1.866     103.88     851.04     0.170       0.37       3.03     0.0006
   6       0.30      93.80       0.47     1118.28   104894.31     0.524      16.87    1582.43     0.008       3.33     312.40     0.0016
   7       5.00      70.30       5.83     1130.95    79505.81     6.599      16.48    1158.66     0.096       3.29     231.38     0.0192
   9       6.00      29.30       2.93      978.72    28676.38     2.868      20.40     597.64     0.060       5.34     156.35     0.0156
  10       4.00       8.20       0.55     1030.79     8452.44     0.566     284.92    2336.35     0.157       0.90       7.42     0.0005

TOTAL FOR CYCLE                 11.423                           12.423                          0.491                           0.0375

TOTAL FOR CYCLE/LB FUEL                                           1.088                          0.043                           0.0033
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DATE:   8/ 6/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  273    ENGINE TYPE AND MODEL:  IO-360-A1A            SERIAL NUMBER:   L-2920-51AC

                            RATED HORSEPOWER:   200.

     ENGINE TOTAL TIME:   1024. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   77.00   FINISH   80.00

     ATMOSPHERIC PRESSURE:              START   30.18   FINISH   30.18

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.02

     RELATIVE HUMIDITY:                     79.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  10

COMMENTS:



                       CARB.    TEST      ENGINE       MEASURED       MEASURED       CALCULATED
                      HEATER    MODE       RPM        FUEL FLOW       AIR FLOW          F/A
                                                        LB/HR          LB/HR

IDLE-LOW                         1        -0.0           4.70          33.00         0.08473
IDLF/TAXI                        2        -0.0           8.20          76.00         0.07456
RUN UP                           3        -0.0          28.10         344.00         0.06968
RUN UP-LEAN                      4        -0.0          28.10         342.00         0.06987
RUN UP-RICH                      5        -0.0          27.00         333.00         0.06990
TAKE-OFF                         6        -0.0          92.60        1017.00         0.07666
CLIMB                            7        -0.0          70.30         793.00         0.07493
DESCENT                          8        -0.0          50.40         586.00         0.07301
APPROACH                         9        -0.0          27.00         315.00         0.07067
TAXI                            10        -0.0           9.40          81.00         0.08042


 TEST   EXHAUST     EXHAUST      CO          CO         THC        NO         NO         NO      ALDEHYDES      SMOKE     PARTICULATES
 MODE     GAS         GAS       (DRY)         2        (DRY)      (DRY)        2          X        (DRY)
          TEMP      PRESSURE  PERCENT V     (DRY)      PPMV       PPMV      (DRY)      (DRY)
       DEGREES F      PSIA                PERCENT V                          PPMV       PPMV

   1     504.00      -0.00       7.50        4.50   60115.00     48.00      -0.00      -0.00       44.00       -0.00         -0.00
   2     560.00      -0.00       7.60        5.70   26352.00     86.00      -0.00      -0.00       42.00       -0.00         -0.00
   3    1065.00      -0.00       6.10        8.70    3019.00    415.00      -0.00      -0.00       -0.00       -0.00         -0.00
   4    1020.00      -0.00       6.20        8.60    3349.00    253.00      -0.00      -0.00       -0.00       -0.00         -0.00
   5    1087.00      -0.00       6.00        8.90    2635.00    243.00      -0.00      -0.00       -0.00       -0.00         -0.00
   6    1256.00      -0.00       9.20        7.00    2690.00    137.00      -0.00      -0.00       -0.00       -0.00         -0.00
   7    1256.00      -0.00       8.50        7.40    2306.00    171.00      -0.00      -0.00       15.00       -0.00         -0.00
   8    1188.00      -0.00       7.60        7.90    2580.00    281.00      -0.00      -0.00       10.00       -0.00         -0.00
   9    1054.00      -0.00       7.30        7.70    2416.00    258.00      -0.00      -0.00        9.00       -0.00         -0.00
  10     695.00      -0.00       9.00        5.10   30305.00    104.00      -0.00      -0.00       23.00       -0.00         -0.00


 TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE      CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
         LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
        LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1    841.23    386.17      0.0     793.05      0.88      0.88   3953.77   1815.01      0.0    3727.35      4.16      4.16
   2    963.51    191.34      0.0    1135.42      1.79      1.79   7900.81   1568.98      0.0    9310.46     14.69     14.69
   3    816.02     23.13      0.0    1828.64      9.12      9.12  22930.11    649.96      0.0   51384.69    256.24    256.24
   4    827.59     25.60      0.0    1803.68      5.55      5.55  23255.19    719.43      0.0   50683.33    155.87    155.87
   5    799.38     20.11      0.0    1863.08      5.32      5.32  21583.27    542.87      0.0   50303.05    143.58    143.58
   6   1128.55     18.90      0.0    1349.18      2.76      2.76 104504.06   1750.02      0.0  124934.25    255.61    255.61
   7   1064.56     16.54      0.0    1456.20      3.52      3.52  74838.56   1162.81      0.0  102370.81    247.30    247.30
   8    974.35     18.94      0.0    1591.35      5.92      5.92  49107.16    954.76      0.0   80204.00    298.23    298.23
   9    967.60     18.34      0.0    1603.62      5.62      5.62  26125.09    495.20      0.0   43297.61    151.66    151.66
  10   1061.39    204.69      0.0     945.02      2.01      2.01   9977.05   1924.06      0.0    8883.17     18.94     18.94


                                                  LTO CYCLE EMISSIONS

 TEST    TIME IN   MEASURED     FUEL       CO         CO         CO        HC        HC        HC        NO        NO        NO
 MODE     MODE    FUEL FLOW     USED     LB/1K      LB/1K     EMISSION   LB/1K     LB/1K    EMISSION   LB/1K     LB/1K    EMISSION
          MIN.      LB/HR       LBS.    LB FUEL     HOURS       LBS.    LB FUEL    HOURS      LBS.    LB FUEL    HOURS      LBS.

   2     12.00       8.20       1.64     963.51    7900.81     1.580    191.34   1568.98     0.314      1.79     14.69    0.0029
   6      0.30      92.60       0.46    1128.55  104504.06     0.523     18.90   1750.02     0.009      2.76    255.61    0.0013
   7      5.00      70.30       5.83    1064.56   74838.56     6.212     16.54   1162.81     0.097      3.52    247.30    0.0205
   9      6.00      27.00       2.70     967.60   26125.09     2.613     18.34    495.20     0.050      5.62    151.66    0.0152
  10      4.00       9.40       0.63    1061.39    9977.05     0.668    204.69   1924.06     0.129      2.01     18.94    0.0013

TOTAL FOR CYCLE                11.268                          11.595                        0.597                        0.0412

TOTAL FOR CYCLE/LB FUEL                                         1.029                        0.053                        0.0037
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DATE: 8/ 6/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 274 ENGINE TYPE AND MODEL: IO-360-A1A SERIAL NUMBER: L-2829-51AD

RATED HORSEPOWER: 200.

ENGINE TOTAL TIME: 1024. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 79.00 FINISH 79.00

ATMOSPHERIC PRESSURE: START 30.18 FINISH 30.18

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 79.00 PERCENT

SAMPLE LINE: TEMPERATURE, CEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	8.20	43.00	0.10251
IDLE/TAXI		2	-0.0	8.20	57.00	0.09377
RUN UP		3	-0.0	28.10	318.00	0.07675
RUN UP-LEAN		4	-0.0	28.10	316.00	0.07749
RUN UP-RICH		5	-0.0	29.30	331.00	0.07604
TAKE-OFF		6	-0.0	94.90	991.00	0.08252
CLIMB		7	-0.0	85.60	900.00	0.08106
DESCENT		8	-0.0	-0.00	-0.00	0.08369
APPROACH		9	-0.0	27.00	310.00	0.06821
TAXI		10	-0.0	8.20	56.00	0.08597

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	538.00	-0.00	8.50	3.20	99541.00	9.00	-0.00	-0.00	43.00	-0.00	-0.00
2	617.00	-0.00	9.90	4.10	58782.00	14.00	-0.00	-0.00	60.00	-0.00	-0.00
3	1031.00	-0.00	3.50	7.60	4381.00	154.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	986.00	-0.00	8.70	7.50	4880.00	108.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1009.00	-0.00	8.50	7.50	3771.00	95.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1211.00	-0.00	10.90	6.50	2773.00	74.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1222.00	-0.00	10.60	6.50	2662.00	73.00	-0.00	-0.00	20.00	-0.00	-0.00
8	1188.00	-0.00	11.60	6.00	2828.00	51.00	-0.00	-0.00	13.00	-0.00	-0.00
9	1031.00	-0.00	7.30	7.10	2717.00	208.00	-0.00	-0.00	15.00	-0.00	-0.00
10	673.00	-0.00	9.10	3.60	54900.00	20.00	-0.00	-0.00	34.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	793.01	531.87	0.0	469.08	0.14	0.14	6502.71	4361.37	0.0	3846.43	1.13	1.13
2	1006.14	342.15	0.0	654.71	0.23	0.23	8250.38	2805.62	0.0	5368.59	1.92	1.92
3	1038.33	30.65	0.0	1458.71	3.09	3.09	29177.05	861.27	0.0	40989.62	86.93	86.83
4	1053.21	33.83	0.0	1426.58	2.15	2.15	29595.32	950.75	0.0	40086.96	60.35	60.35
5	1048.54	26.64	0.0	1453.67	1.92	1.92	30722.12	780.61	0.0	42592.36	56.40	56.40
6	1245.70	18.15	0.0	1167.18	1.39	1.39	118216.56	1722.45	0.0	110765.25	131.83	131.83
7	1233.11	17.74	0.0	1188.09	1.39	1.39	105554.31	1518.18	0.0	101700.25	119.40	119.40
8	1310.46	18.30	0.0	1065.02	0.95	0.95	-0.00	-0.00	0.0	-0.00	-0.00	-0.00
9	1005.18	21.43	0.0	1536.09	4.70	4.70	27139.89	578.52	0.0	41474.53	127.02	127.02
10	1010.67	349.21	0.0	628.22	0.36	0.36	8287.52	2863.52	0.0	5151.38	2.99	2.99

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	8.20	1.64	1006.14	8250.38	1.650	342.15	2805.62	0.561	0.23	1.92	0.0004
6	0.30	94.90	0.47	1245.70	118216.56	0.591	18.15	1722.45	0.009	1.39	131.83	0.0007
7	5.00	85.60	7.10	1233.11	105554.31	8.761	17.74	1518.18	0.126	1.39	119.40	0.0099
9	6.00	27.00	2.70	1005.18	27139.89	2.714	21.43	578.52	0.058	4.70	127.02	0.0127
10	4.00	8.20	0.55	1010.67	8287.52	0.555	349.21	2863.52	0.192	0.36	2.99	0.0002
TOTAL FOR CYCLE			12.469			14.271			0.945			0.0239
TOTAL FOR CYCLE/LB FUEL						1.145			0.076			0.0019

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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  178    ENGINE TYPE AND MODEL:  IO-360-A186            SERIAL NUMBER:   L-7682-51AA

                            RATED HORSEPOWER:   200.

     ENGINE TOTAL TIME:    660. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   89.00   FINISH   90.50

     ATMOSPHERIC PRESSURE:              START   30.13   FINISH   30.13

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.02

     RELATIVE HUMIDITY:                     59.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  10

COMMENTS:
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	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	22.30	201.00	0.05868
IDLE/TAXI		2	-0.0	23.40	225.00	0.07278
RUN UP		3	-0.0	36.30	347.00	0.09503
RUN UP-LEAN		4	-0.0	37.50	361.00	0.08810
RUN UP-RICH		5	-0.0	36.30	348.00	0.08537
TAKE-OFF		6	-0.0	85.60	945.00	0.08756
CLIMB		7	-0.0	82.00	893.00	0.08850
DESCENT		8	-0.0	64.50	697.00	0.08761
APPROACH		9	-0.0	44.50	424.00	0.09458
TAXI		10	-0.0	21.10	195.00	0.06253

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	415.00	-0.00	8.40	3.20	7958.00	12.00	-0.00	-0.00	86.00	-0.00	-0.00
2	471.00	-0.00	10.00	4.70	7706.00	3.00	-0.00	-0.00	73.00	-0.00	-0.00
3	762.00	-0.00	13.90	5.80	5691.00	12.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	717.00	-0.00	12.60	5.60	5843.00	12.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	785.00	-0.00	12.30	5.30	5792.00	7.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1099.00	-0.00	10.30	8.20	4029.00	140.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1166.00	-0.00	10.80	7.90	3778.00	97.00	-0.00	-0.00	11.00	-0.00	-0.00
8	1132.00	-0.00	10.80	7.70	3677.00	95.00	-0.00	-0.00	9.00	-0.00	-0.00
9	953.00	-0.00	14.00	5.70	4634.00	23.00	-0.00	-0.00	11.00	-0.00	-0.00
10	527.00	-0.00	9.00	3.60	6296.00	6.30	-0.00	-0.00	79.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	1369.01	74.28	0.0	819.44	0.32	0.32	30528.90	1656.46	0.0	18273.42	7.16	7.16
2	1305.85	57.63	0.0	964.34	0.06	0.06	30556.97	1348.60	0.0	22565.58	1.51	1.51
3	1385.42	32.49	0.0	908.31	0.20	0.20	50290.82	1179.25	0.0	32971.62	7.13	7.13
4	1355.12	35.99	0.0	946.31	0.21	0.21	50816.97	1349.64	0.0	35486.63	7.95	7.95
5	1366.89	36.86	0.0	925.43	0.13	0.13	49617.92	1338.16	0.0	33592.91	4.64	4.64
6	1100.81	24.66	0.0	1376.97	2.46	2.46	94228.88	2111.00	0.0	117868.81	210.38	210.38
7	1143.66	22.91	0.0	1314.43	1.69	1.69	93780.19	1878.86	0.0	107783.56	138.35	138.35
8	1156.40	22.55	0.0	1295.42	1.67	1.67	74587.50	1454.39	0.0	83554.81	107.77	107.77
9	1402.71	26.59	0.0	897.33	0.38	0.38	62420.42	1183.31	0.0	39931.14	16.84	16.84
10	1374.35	55.06	0.0	863.77	0.15	0.15	28998.79	1161.84	0.0	18225.43	3.18	3.18

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUFL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	23.40	4.68	1305.85	30556.97	6.111	57.63	1348.60	0.270	0.06	1.51	0.0003
6	0.30	85.60	0.43	1100.81	94228.88	0.471	24.66	2111.00	0.011	2.46	210.38	0.0011
7	5.00	82.00	6.81	1143.66	93780.19	7.784	22.91	1878.86	0.156	1.69	138.35	0.0115
9	6.00	44.50	4.45	1402.71	62420.42	6.242	26.59	1183.31	0.118	0.38	16.84	0.0017
10	4.00	21.10	1.41	1374.35	28998.79	1.943	55.06	1161.84	0.078	0.15	3.18	0.0002
TOTAL FOR CYCLE			17.778			22.551			0.632			0.0147
TOTAL FOR CYCLE/LB FUEL						1.269			0.036			0.0008

DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 179 ENGINE TYPE AND MODEL: IO-360-A1B6 SERIAL NUMBER: L-7682-51AB

RATED HORSEPOWER: 200.

ENGINE TOTAL TIME: 663. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 89.00 FINISH 89.00

ATMOSPHERIC PRESSURE: START 3C.12 FINISH 30.12

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 59.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	14.10	136.00	0.04283
IDLE/TAXI		2	-0.0	14.10	144.00	0.05500
RUN UP		3	-0.0	34.00	321.00	0.08228
RUN UP-LEAN		4	-0.0	34.00	324.00	0.07196
RUN UP-RICH		5	-0.0	34.00	329.00	0.07224
CLIMB		7	-0.0	79.00	1050.00	0.08353
DESCENT		8	-0.0	66.80	735.00	0.C8250
APPROACH		9	-0.0	44.50	446.00	0.C8918
TAXI		10	-0.0	14.10	133.00	0.05960
TAKE-OFF		6	-0.0	96.10	-0.00	0.08127

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	303.00	-0.00	5.30	3.00	7514.00	27.00	-0.00	-0.00	90.00	-0.00	-0.00
2	404.00	-0.00	6.40	4.50	7969.00	39.00	-0.00	-0.00	53.00	-0.00	-0.00
3	717.00	-0.00	11.80	5.00	7008.00	15.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	650.00	-0.00	10.10	4.50	6806.00	10.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	740.00	-0.00	10.00	4.70	6553.00	12.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1177.00	-0.00	10.00	7.6C	3870.00	115.00	-0.00	-0.00	13.00	-0.00	-0.00
8	1155.00	-0.00	9.80	7.60	3668.00	115.00	-0.00	-0.00	10.00	-0.00	-0.00
9	964.00	-0.00	12.60	6.00	4478.00	35.00	-0.00	-0.00	5.00	-0.00	-0.00
10	538.00	-0.00	8.30	3.70	6198.00	14.00	-0.00	-0.00	79.00	-0.00	-0.00
6	1130.00	-0.00	9.00	8.10	4470.00	155.00	-0.00	-0.00	-0.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	1182.94	96.05	0.0	1052.07	0.99	0.99	16679.41	1354.32	0.0	14834.22	13.96	13.96
2	1105.38	78.83	0.0	1221.19	1.11	1.11	15585.84	1111.47	0.0	17218.72	15.60	15.60
3	1362.15	46.33	0.0	906.89	0.28	0.28	46313.20	1575.30	0.0	30834.07	9.67	9.67
4	1335.31	51.53	0.0	934.79	0.22	0.22	4540C.62	1752.18	0.0	31792.71	7.38	7.38
5	1315.66	49.38	0.0	971.58	0.26	0.26	44732.42	1678.83	0.0	33033.80	8.82	8.82
7	1123.16	24.89	0.0	1341.20	2.12	2.12	E8729.94	1966.65	0.0	105955.06	167.61	167.61
8	1114.34	23.89	0.0	1357.83	2.15	2.15	74438.00	1595.67	0.0	90702.69	143.48	143.48
9	1336.37	27.20	0.0	999.88	0.61	0.61	59468.54	1210.45	0.0	44494.52	27.13	27.13
10	1328.70	56.83	0.0	930.66	0.37	0.37	18734.68	801.24	0.0	13122.26	5.19	5.19
6	1036.20	29.47	0.0	1465.29	2.93	2.93	99578.25	2832.53	0.0	140813.88	281.69	281.69

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODF MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	14.10	2.82	1105.38	15585.84	3.117	78.83	1111.47	0.222	1.11	15.60	0.0031
6	0.30	96.10	0.48	1036.20	99578.25	0.498	29.47	2832.53	0.014	2.93	281.69	0.0014
7	5.00	79.00	6.56	1123.16	88729.94	7.365	24.89	1966.65	0.163	2.12	167.61	0.0139
9	6.00	44.50	4.45	1336.37	59468.54	5.947	27.20	1210.45	0.121	0.61	27.13	0.0027
10	4.00	14.10	0.94	1328.70	18734.68	1.255	56.83	801.24	0.054	0.37	5.19	0.0003
TOTAL FOR CYCLE			15.252			18.182			0.574			0.0215
TOTAL FOR CYCLE/LB FUEL						1.192			0.038			0.0014

DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 180 ENGINE TYPE AND MODEL: IO-360-A186 SERIAL NUMBER: L-7682-51AC

RATED HORSEPOWER: 200.

ENGINE TOTAL TIME: 666. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 89.00 FINISH 89.00

ATMOSPHERIC PRESSURE: START 30.11 FINISH 30.11

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 58.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	14.10	147.00	0.04396
IDLE/TAXI		2	-0.0	14.10	129.00	0.05990
RUN UP		3	-0.0	34.00	336.00	0.07873
RUN UP-LEAN		4	-0.0	4.00	339.00	0.07361
RUN UP-RICH		5	-0.0	32.80	329.00	0.07418
TAKE-OFF		6	-0.0	85.60	983.00	0.07528
CLIMB		7	-0.0	84.40	924.00	0.07785
DESCENT		8	-0.0	66.80	739.00	0.07614
APPROACH		9	-0.0	45.70	459.00	0.08064
TAXI		10	-0.0	12.90	119.00	0.06034

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	325.00	-0.00	6.00	3.30	-0.00	15.00	-0.00	-0.00	53.00	-0.00	-0.00
2	415.00	-0.00	6.50	4.20	20210.00	16.00	-0.00	-0.00	74.00	-0.00	-0.00
3	751.00	-0.00	10.80	5.40	5826.00	22.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	695.00	-0.00	9.90	5.20	5826.00	18.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	807.00	-0.00	10.00	5.30	5106.00	20.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1121.00	-0.00	8.20	7.80	2373.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1155.00	-0.00	9.50	7.00	2230.00	98.00	-0.00	-0.00	40.00	-0.00	-0.00
8	1143.00	-0.00	9.00	7.10	2661.00	57.00	-0.00	-0.00	21.00	-0.00	-0.00
9	975.00	-0.00	11.10	5.70	4100.00	-0.00	-0.00	-0.00	30.00	-0.00	-0.00
10	516.00	-0.00	6.60	4.30	19203.00	36.00	-0.00	-0.00	21.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	1303.38	-0.00	0.0	1126.34	0.54	0.54	18377.61	-0.00	0.0	15881.45	7.55	7.55
2	1032.27	183.82	0.0	1048.02	0.42	0.42	14555.02	2591.86	0.0	14777.03	5.88	5.88
3	1300.07	40.17	0.0	1021.35	0.43	0.43	44202.31	1365.64	0.0	34725.91	14.79	14.79
4	1275.32	42.98	0.0	1052.51	0.38	0.38	5101.27	171.93	0.0	4210.03	1.52	1.52
5	1277.77	37.37	0.0	1064.06	0.42	0.42	41910.92	1225.61	0.0	34901.27	13.77	13.77
6	1020.24	16.91	0.0	1524.83	-0.00	-0.00	87332.38	1447.45	0.0	130525.19	-0.00	-0.00
7	1147.66	15.43	0.0	1328.69	1.94	1.94	96861.94	1302.21	0.0	112141.44	164.13	164.13
8	1110.96	18.81	0.0	1377.06	1.16	1.16	74212.19	1256.67	0.0	91987.56	77.20	77.20
9	1303.00	27.56	0.0	1051.32	-0.00	-0.00	59547.03	1259.70	0.0	48045.24	-0.00	-0.00
10	1040.03	173.31	0.0	1064.66	0.93	0.93	13416.44	2235.67	0.0	13734.10	12.02	12.02

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	14.10	2.82	1032.27	14555.02	2.911	183.82	2591.86	0.518	0.42	5.88	0.0012
6	0.30	85.60	0.43	1020.24	87332.38	0.437	16.91	1447.45	0.007	-0.00	-0.00	-0.0000
7	5.00	84.40	7.01	1147.66	96861.94	8.040	15.43	1302.21	0.108	1.94	164.13	0.0136
9	6.00	45.70	4.57	1303.00	59547.03	5.955	27.56	1259.70	0.126	-0.00	-0.00	-0.0000
10	4.00	12.90	0.86	1040.03	13416.44	0.899	173.31	2235.67	0.150	0.93	12.02	0.0008
TOTAL FOR CYCLE			15.687			18.241			0.909			-0.0000
TOTAL FOR CYCLE/LB FUEL						1.163			0.058			-0.0000

DATE: 7/30/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 256 ENGINE TYPE AND MODEL: IO-360-B1E SERIAL NUMBER: L-4835-51AA

RATED HORSEPOWER: 180.

ENGINE TOTAL TIME: 1179. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 80.00 FINISH 85.00

ATMOSPHERIC PRESSURE: START 30.15 FINISH 30.15

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 40.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

ANALYSIS DONE ON FRONT EXHAUST.

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	12.30	122.00	0.07073
IDLE/TAXI		2	-0.0	15.80	182.00	0.06348
RUN UP		3	-0.0	28.10	373.00	0.05699
RUN UP-LEAN		4	-0.0	21.10	279.00	0.05781
RUN UP-RICH		5	-0.0	28.10	372.00	0.05729
TAKE-OFF		6	-0.0	54.50	639.00	0.06415
CLIMB		7	-0.0	43.90	572.00	0.05920
DESCENT		8	-0.0	38.70	516.00	0.05634
APPROACH		9	-0.0	28.10	354.00	0.06010
TAXI		10	-0.0	14.10	155.00	0.06350

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	628.00	-0.00	7.70	5.80	16217.00	10.00	-0.00	-0.00	35.00	-0.00	-0.00
2	695.00	-0.00	6.50	6.70	[illegible]	[illegible]	-0.00	-0.00	23.00	-0.00	-0.00
3	1312.00	-0.00	3.40	8.80	[illegible]	[illegible]	-0.00	-0.00	-0.00	-0.00	-0.00
4	1300.00	-0.00	3.50	8.90	[illegible]	[illegible]	-0.00	-0.00	-0.00	-0.00	-0.00
5	1323.00	-0.00	3.50	8.80	[illegible]	[illegible]	-0.00	-0.00	-0.00	-0.00	-0.00
6	1401.00	-0.00	6.50	7.10	[illegible]	219.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1435.00	-0.00	4.00	8.70	[illegible]	769.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1401.00	-0.00	3.20	8.90	1351.00	901.00	-0.00	-0.00	11.00	-0.00	-0.00
9	1256.00	-0.00	4.70	8.10	1971.00	387.00	-0.00	-0.00	7.00	-0.00	-0.00
10	740.00	-0.00	7.10	5.90	5856.00	30.00	-0.00	-0.00	11.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	1028.71	124.08	0.0	1217.50	0.22	0.22	12653.10	1526.24	0.0	14975.20	2.70	2.70
2	963.17	36.80	0.0	1559.93	0.88	0.88	15218.15	581.41	0.0	24646.83	13.84	13.84
3	555.33	15.80	0.0	2258.35	16.82	16.82	15604.71	443.97	0.0	63459.68	472.68	472.68
4	563.32	14.01	0.0	2250.70	7.98	7.98	11886.09	295.64	0.0	47489.70	168.46	168.46
5	568.62	12.57	0.0	2246.33	8.06	8.06	15978.15	353.23	0.0	63121.84	226.46	226.46
6	951.37	16.99	0.0	1632.80	5.27	5.27	51849.87	926.05	0.0	88987.81	286.94	286.94
7	629.32	12.69	0.0	2150.64	19.87	19.87	27627.01	556.96	0.0	[illegible]	872.41	872.41
8	528.38	12.78	0.0	2308.99	24.60	24.60	20448.18	494.43	0.0	89358.00	951.99	951.99
9	730.56	17.55	0.0	1978.24	9.88	9.88	20528.59	493.05	0.0	55588.48	277.65	277.65
10	1055.80	49.87	0.0	1378.52	0.73	0.73	14886.77	703.22	0.0	19437.13	10.33	10.33

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	15.80	3.16	963.17	15218.15	3.044	36.80	581.41	0.116	0.88	13.84	0.0028
6	0.30	54.50	0.27	951.37	51849.87	0.259	16.99	926.05	0.005	5.27	286.94	0.0014
7	5.00	43.90	3.64	629.32	27627.01	2.293	12.69	556.96	0.046	19.87	872.41	0.0724
9	6.00	28.10	2.81	730.56	20528.59	2.053	17.55	493.05	0.049	9.88	277.65	0.0278
10	4.00	14.10	0.94	1055.80	14886.77	0.997	49.87	703.22	0.047	0.73	10.33	0.0007
TOTAL FOR CYCLE			10.831			8.646			0.264			0.1051
TOTAL FOR CYCLE/LB FUEL						0.798			0.024			0.0097

DATE: 7/30/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 257 ENGINE TYPE AND MODEL: IO-360-B1E SERIAL NUMBER: L-4835-51AB

RATED HORSEPOWER: 180.

ENGINE TOTAL TIME: 1180. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 85.00 FINISH 83.00

ATMOSPHERIC PRESSURE: START 30.15 FINISH 30.15

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 38.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

ANALYSIS DONE ON FRONT EXHAUST.

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	12.30	96.00	0.06297
IDLE/TAXI		2	-0.0	15.80	170.00	0.06147
RUN UP		3	-0.0	29.90	383.0C	0.05914
RUN UP-LEAN		4	-0.0	21.10	273.00	0.05942
RUN UP-RICH		5	-0.0	29.90	384.00	0.05983
TAKE-OFF		6	-0.0	54.50	643.00	0.06554
CLIMB		7	-0.0	43.90	521.00	0.06229
DESCENT		8	-0.0	38.70	469.00	0.06124
APPROACH		9	-0.0	28.10	353.00	0.05918
TAXI		10	-0.0	14.10	132.00	0.07141

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	504.00	-0.00	4.90	4.20	42822.00	17.00	-0.00	-0.00	28.00	-0.00	-0.00
2	650.00	-0.00	5.50	6.30	13835.00	44.00	-0.00	-0.00	24.00	-0.00	-0.00
3	1267.00	-0.00	4.20	8.40	2086.00	456.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1300.00	-0.00	4.10	8.60	1812.00	237.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1312.00	-0.00	4.30	8.50	1647.00	225.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1368.00	-0.00	6.50	7.40	2196.00	245.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1356.00	-0.00	6.10	7.10	2031.00	265.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1323.00	-0.00	5.60	7.40	1976.00	314.00	-C.00	-0.00	5.00	-0.00	-0.00
9	1244.00	-0.00	4.70	7.90	1867.00	372.00	-0.00	-0.00	6.00	-0.00	-0.00
10	[illegible]45.00	-0.00	8.90	4.90	13999.00	10.00	-0.00	-0.00	18.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	739.73	370.24	0.0	996.24	0.42	0.42	9098.62	4553.98	0.0	12253.69	5.18	5.18
2	842.82	121.42	0.0	1516.88	1.11	1.11	13316.52	1918.46	0.0	23966.67	17.50	17.50
3	662.44	18.84	0.0	2081.70	11.81	11.81	19807.08	563.42	0.0	62242.77	353.23	353.23
4	643.03	16.28	0.0	2119.25	6.11	6.11	13567.86	343.42	0.0	44716.15	128.82	128.82
5	670.05	14.70	0.0	2081.12	5.76	5.76	20034.50	439.49	0.0	62225.37	172.19	172.19
6	930.02	18.00	0.0	1663.60	5.76	5.76	50686.14	980.74	0.0	90666.25	313.81	313.81
7	919.45	17.53	0.0	1681.49	6.56	6.56	40363.69	769.69	0.0	73817.19	288.02	288.02
8	857.23	17.32	0.0	1779.82	7.90	7.90	33174.61	670.42	0.0	68879.13	305.54	305.54
9	742.58	16.89	0.0	1961.14	9.65	9.65	20866.39	474.72	0.0	55108.03	271.28	271.28
10	1182.91	106.56	0.0	1023.28	0.22	0.22	16679.00	1502.53	0.0	14428.23	3.08	3.08

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	15.80	3.16	842.82	13316.52	2.663	121.42	1918.46	0.384	1.11	17.50	0.0035
6	0.30	54.50	0.27	930.02	50686.14	0.253	18.00	980.74	0.005	5.76	313.81	0.0016
7	5.00	43.90	3.64	919.45	40363.69	3.350	17.53	769.69	0.064	6.56	288.02	0.0239
9	6.00	28.10	2.81	742.58	20866.39	2.087	16.89	474.72	0.047	9.65	271.28	0.0271
10	4.00	14.10	0.94	1182.91	16679.00	1.117	106.56	1502.53	0.101	0.22	3.08	0.0002
TOTAL FOR CYCLE			10.831			9.471			0.601			0.0563
TOTAL FOR CYCLE/LB FUEL						0.874			0.055			0.0052

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DATE:   7/30/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:  258    ENGINE TYPE AND MODEL:  IO-360-B1E             SERIAL NUMBER:   L-4835-51AC

                            RATED HORSEPOWER:   180.

     ENGINE TOTAL TIME:   1180. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA ******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   84.00   FINISH   85.00

     ATMOSPHERIC PRESSURE:              START   30.15   FINISH   30.15

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     36.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  10

COMMENTS:

ANALYSIS DONE ON REAR EXHAUST.


                   CARB.    TEST     ENGINE       MEASURED       MEASURED       CALCULATED
                   HEATER   MODE      RPM         FUEL FLOW      AIR FLOW          F/A
                                                   LB/HR          LB/HR

IDLE-LOW                     1        -0.0         12.30           95.00         0.07571
IDLE/TAXI                    2        -0.0         14.10          144.00         0.06759
RUN UP                       3        -0.0         29.90          354.00         0.06161
RUN UP-LEAN                  4        -0.0         19.30          229.00         0.06236
RUN UP-RICH                  5        -0.0         28.10          333.00         0.06236
TAKF-OFF                     6        -0.0         56.30          648.00         0.06482
CLIMB                        7        -0.0         43.90          499.00         0.06543
DESCENT                      8        -0.0         38.70          440.00         0.06447
APPROACH                     9        -0.0         28.10          316.00         0.06328
TAXI                        10        -0.0         14.10          113.00         0.07777


  TEST   FXHAUST     EXHAUST      CO          CO        THC        NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS         GAS       (DRY)         2       (DRY)     (DRY)        2         X       (DRY)
          TEMP      PRESSURE   PERCENT V    (DRY)      PPMV      PPMV      (DRY)     (DRY)
        DEGREES F     PSIA                PERCENT V                        PPMV      PPMV

   1     594.00      -0.00        8.20       4.00  38540.00      5.00     -0.00     -0.00     26.00      -0.00        -0.00
   2     650.00      -0.00        7.50       5.80  11529.00     27.00     -0.00     -0.00     31.00      -0.00        -0.00
   3    1166.00      -0.00        6.00       7.00   2525.00    170.00     -0.00     -0.00     -0.00      -0.00        -0.00
   4    1143.00      -0.00        6.10       7.10   2196.00     97.00     -0.00     -0.00     -0.00      -0.00        -0.00
   5    1188.00      -0.00        6.10       7.10   2196.00     97.00     -0.00     -0.00     -0.00      -0.00        -0.00
   6    1345.00      -0.00        6.90       6.80   2251.00    159.00     -0.00     -0.00     -0.00      -0.00        -0.00
   7    1267.00      -0.00        7.20       6.60   2416.00    144.00     -0.00     -0.00     11.00      -0.00        -0.00
   8    1222.00      -0.00        7.10       6.50   2306.00    150.00     -0.00     -0.00      7.00      -0.00        -0.00
   9    1121.00      -0.00        7.10       6.20   2580.00    116.00     -0.00     -0.00     11.00      -0.00        -0.00
  10     762.00      -0.00        9.70       4.30  25034.00      6.00     -0.00     -0.00     30.00      -0.00        -0.00


  TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE       CO         HC         NO2        CO2         NO        NOX         CO         HC         NO2        CO2         NO        NOX
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1     1031.89     277.76       0.0      790.89       0.10       0.10   12692.21    3416.49        0.0     9727.96       1.27       1.27
   2     1048.35      92.30       0.0     1273.84       0.62       0.62   14781.80    1301.38        0.0    17961.06       8.74       6.74
   3      914.65      22.05       0.0     1676.64       4.26       4.26   27348.05     659.15        0.0    50131.57     127.28     127.28
   4      918.32      18.93       0.0     1679.42       2.40       2.40   17723.48     365.42        0.0    32412.75      46.29      46.29
   5      918.32      18.93       0.0     1679.42       2.40       2.40   25804.67     532.04        0.0    47191.62      67.40      67.40
   6     1001.04      18.70       0.0     1550.07       3.79       3.79   56358.69    1053.01        0.0    87268.75     213.32     213.32
   7     1035.90      19.91       0.0     1492.00       3.40       3.40   45475.98     873.96        0.0    65498.59     149.39     149.39
   8     1037.10      19.29       0.0     1491.81       3.60       3.60   40135.62     746.58        0.0    57732.91     139.28     139.28
   9     1057.95      22.02       0.0     1451.56       2.84       2.84   29728.33     618.70        0.0    40788.94      79.78      79.78
  10     1187.41     175.51       0.0      827.06       0.12       0.12   16742.45    2474.70        0.0    11661.49       1.70       1.70


                                                    LTO CYCLE EMISSIONS

  TEST    TIME IN    MEASURED     FUEL       CO          CO         CO         HC         HC          HC         NO         NO          NC
  MODE     MODE     FUEL FLOW     USED      LB/1K       LB/1K    EMISSION     LB/1K      LB/1K     EMISSION     LB/1K      LB/1K     EMISSION
           MIN.       LB/HR       LBS.     LB FUEL      HOURS      LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.

   2      12.00       14.10       2.82     1048.35   14781.80     2.956      92.30     1301.38      0.260       0.62       8.74     0.0017
   6       0.30       56.30       0.28     1001.04   56358.69     0.282      18.70     1053.01      0.005       3.79     213.32     0.0011
   7       5.00       43.90       3.64     1035.90   45475.98     3.775      19.91      873.96      0.073       3.40     149.39     0.0124
   9       6.00       28.10       2.81     1057.95   29728.33     2.973      22.02      618.70      0.062       2.84      79.78     0.0080
  10       4.00       14.10       0.94     1187.41   16742.45     1.122     175.51     2474.70      0.166       0.12       1.70     0.0001

TOTAL FOR CYCLE                  10.500                          11.107                            0.566                          0.0233

TOTAL FOR CYCLE/LB FUEL                                           1.058                            0.054                          0.0022
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:  196    ENGINE TYPE AND MODEL:  IO-360-C                 SERIAL NUMBER:   F/51634-70CA

                            RATED HORSEPOWER:   210.

     ENGINE TOTAL TIME:    169. HRS

     FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   90.00   FINISH   88.00

     ATMOSPHERIC PRESSURE:              START   30.14   FINISH   30.14

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     51.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  10

COMMENTS:



                     CARB.     TEST      ENGINE        MEASURED        MEASURED      CALCULATED
                     HEATER    MODE       RPM          FUEL FLOW       AIR FLOW         F/A
                                                        LB/HR           LB/HR

IDLE-LOW                         1        -0.0          16.40          145.00        0.06097
IDLE/TAXI                        2        -0.0          22.30          212.00        0.05909
RUN UP                           3        -0.0          23.40          266.00        0.07676
RUN UP-LEAN                      4        -0.0          19.90          228.00        0.06964
RUN UP-RICH                      5        -0.0          22.30          257.00        0.07304
TAKE-OFF                         6        -0.0         109.00         1221.00        0.07945
CLIMB                            7        -0.0          73.80          839.00        0.08010
DESCENT                          8        -0.0          56.30          630.00        0.08112
APPROACH                         9        -0.0          41.00          453.00        0.08222
TAXI                            10        -0.0          23.40          182.00        0.06048


TEST   EXHAUST     EXHAUST       CO         CO          THC        NO         NO         NO      ALDEHYDES     SMOKE     PARTICULATES
MODE     GAS         GAS        (DRY)        2         (DRY)      (DRY)        2          X        (DRY)
        TEMP      PRESSURE   PERCENT V    (DRY)        PPMV       PPMV       (DRY)      (DRY)
     DEGREES F      PSIA                PERCENT V                            PPMV       PPMV

  1    448.00      -0.00        3.90       5.30   38264.00     11.00      -0.00      -0.00      51.00       -0.00          -0.00
  2    471.00      -0.00        3.40       5.90   33605.00     20.00      -0.00      -0.00      -0.00       -0.00          -0.00
  3    852.00      -0.00        7.70       8.10    7819.00    134.00      -0.00      -0.00      -0.00       -0.00          -0.00
  4    740.00      -0.00        6.60       7.60    8152.00     78.00      -0.00      -0.00      -0.00       -0.00          -0.00
  5    874.00      -0.00        6.90       8.10    7819.00     98.00      -0.00      -0.00      -0.00       -0.00          -0.00
  6   1222.00      -0.00        8.50       8.00    6488.00     -0.00      -0.00      -0.00      -0.00       -0.00          -0.00
  7   1323.00      -0.00        8.90       8.10    2939.00    228.00      -0.00      -0.00      18.00       -0.00          -0.00
  8   1256.00      -0.00        9.40       7.80    2884.00    209.00      -0.00      -0.00      16.00       -0.00          -0.00
  9   1143.00      -0.00        9.60       7.70    4159.00    209.00      -0.00      -0.00      13.00       -0.00          -0.00
 10    460.00      -0.00        3.10       4.70   50907.00     14.00      -0.00      -0.00      24.00       -0.00          -0.00


TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
MODE       CO         HC         NO2        CO2         NO         NOX         CO         HC         NO2        CO2         NO         NOX
         LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
        LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

  1     604.84     339.87       0.0     1291.49       0.28       0.28    9919.60    5573.87       0.0    21180.45       4.60       4.60
  2     542.54     307.11       0.0     1479.25       0.52       0.52   12098.58    6848.65       0.0    32987.23      11.69      11.69
  3     938.12      54.56       0.0     1550.57       2.68       2.68   21951.99    1276.67       0.0    36283.26      62.75      62.75
  4     888.00     [illegible]2.87       0.0     1606.66       1.72       1.72   17471.25    1250.07       0.0    31972.41      34.30      34.30
  5     883.27      57.32       0.0     1629.17       2.06       2.06   19696.82    1278.33       0.0    36330.40      45.95      45.95
  6    1001.35      43.77       0.0     1480.80      -0.00      -0.00  109147.38    4771.45       0.0   161407.13      -0.00      -0.00
  7    1039.68      19.66       0.0     1486.73       4.37       4.37   76728.19    1451.14       0.0   109720.63     322.86     322.86
  8    1085.87      19.08       0.0     1415.74       3.97       3.97   61134.72    1074.24       0.0    79706.31     223.27     223.27
  9    1094.74      27.16       0.0     1379.65       3.91       3.91   44884.21    1113.67       0.0    56565.46     160.51     160.51
 10     485.83     456.93       0.0     1157.34       0.36       0.36   11368.48   10692.12       0.0    27081.77       8.43       8.43


                                                   LTO CYCLE EMISSIONS

TEST     TIME IN   MEASURED     FUEL        CO         CO          CO         HC         HC         HC         NO         NO          NO
MODE      MODE     FUEL FLOW    USED      LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION
          MIN.      LB/HR       LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.

  2      12.00      22.30       4.46     542.54   12098.58      2.420     307.11    6848.65      1.370       0.52      11.69     0.0023
  6       0.30     109.00       0.54    1001.35  109147.38      0.546      43.77    4771.45      0.024      -0.00      -0.00    -0.0000
  7       5.00      73.80       6.13    1039.68   76728.19      6.368      19.66    1451.14      0.120       4.37     322.86     0.0268
  9       6.00      41.00       4.10    1094.74   44884.21      4.488      27.16    1113.67      0.111       3.91     160.51     0.0161
 10       4.00      23.40       1.57     485.83   11368.48      0.762     456.93   10692.12      0.716       0.36       8.43     0.0006

TOTAL FOR CYCLE                16.798                           14.584                           2.342                          -0.0000

TOTAL FOR CYCLE/LB FUEL                                          0.868                           0.139                          -0.0000
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DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 197 ENGINE TYPE AND MODEL: IO-360-C SERIAL NUMBER: F/51634-70CB

RATED HORSEPOWER: 210.

ENGINE TOTAL TIME: 169. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 88.00 FINISH 88.00

ATMOSPHERIC PRESSURE: START 30.13 FINISH 30.13

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 52.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	18.80	103.00	0.06883
IDLE/TAXI		2	-0.0	22.30	151.00	0.06851
RUN UP		3	-0.0	24.60	298.00	0.06904
RUN UP-LEAN		4	-0.0	19.90	237.00	0.07796
RUN UP-RICH		5	-0.0	22.30	265.00	0.07508
TAKE-OFF		6	-0.0	106.70	1227.00	0.07928
CLIMB		7	-0.0	78.50	904.00	0.07998
DESCENT		8	-0.0	59.80	668.00	0.08212
APPROACH		9	-0.0	38.70	418.00	0.08367
TAXI		10	-0.0	24.60	188.00	0.06220

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	269.00	-0.00	3.90	3.00	76527.00	5.00	-0.00	-0.00	10.00	-0.00	-0.00
2	348.00	-0.00	3.70	4.30	65714.00	14.00	-0.00	-0.00	31.00	-0.00	-0.00
3	740.00	-0.00	5.60	8.70	6655.00	89.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	650.00	-0.00	6.80	9.40	7431.00	167.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	785.00	-0.00	6.50	9.10	6987.00	137.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1244.00	-0.00	8.30	8.40	4436.00	238.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1334.00	-0.00	8.60	8.40	2939.00	233.00	-0.00	-0.00	14.00	-0.00	-0.00
8	1233.00	-0.00	9.50	7.90	3105.00	184.00	-0.00	-0.00	7.00	-0.00	-0.00
9	1099.00	-0.00	9.90	7.50	6100.00	164.00	-0.00	-0.00	12.00	-0.00	-0.00
10	949.09	-0.00	3.20	4.70	53569.00	14.00	-0.00	-0.00	21.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	541.41	608.44	0.0	654.36	0.11	0.11	10178.42	11438.67	0.0	12302.00	2.14	2.14
2	512.98	521.80	0.0	936.71	0.32	0.32	11439.49	11636.12	0.0	20888.71	7.11	7.11
3	755.96	51.45	0.0	1845.31	1.97	1.97	18596.60	1265.72	0.0	45394.48	48.55	48.55
4	810.81	50.75	0.0	1761.06	3.27	3.27	16135.05	1009.84	0.0	35045.15	65.09	65.09
5	805.68	49.60	0.0	1772.26	2.79	2.79	17966.63	1106.09	0.0	39521.47	62.20	62.20
6	978.09	29.94	0.0	1555.31	4.61	4.61	104361.94	3194.49	0.0	165951.63	491.54	491.54
7	1004.63	19.66	0.0	1541.79	4.47	4.47	78863.63	1543.56	0.0	121030.75	350.96	350.96
8	1083.66	20.29	0.0	1415.91	3.45	3.45	64803.08	1213.05	0.0	84671.50	206.16	206.16
9	1110.51	39.19	0.0	1321.87	3.02	3.02	42976.82	1516.61	0.0	51155.22	116.94	116.94
10	487.65	467.54	0.0	1125.37	0.35	0.35	11996.22	11501.48	0.0	27684.13	8.62	8.62

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	22.30	4.46	512.98	11439.49	2.288	521.80	11636.12	2.327	0.32	7.11	0.0014
6	0.30	106.70	0.53	978.09	104361.94	0.522	29.94	3194.49	0.016	4.61	491.54	0.0025
7	5.00	78.50	6.52	1004.63	78863.63	6.546	19.66	1543.56	0.128	4.47	350.96	0.0291
9	6.00	38.70	3.87	1110.51	42976.82	4.298	39.19	1516.61	0.152	3.02	116.94	0.0117
10	4.00	24.60	1.65	487.65	11996.22	0.804	467.54	11501.48	0.771	0.35	8.62	0.0006
TOTAL FOR CYCLE			17.027			14.457			3.394			0.0453
TOTAL FOR CYCLE/LB FUEL						0.849			0.199			0.0027

DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 198 ENGINE TYPE AND MODEL: IO-360-C SERIAL NUMBER: F/51434-70CC

RATED HORSEPOWER: 210.

ENGINE TOTAL TIME: 170. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 94.00 FINISH 94.00

ATMOSPHERIC PRESSURE: START 30.12 FINISH 30.12

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 46.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	12.90	128.00	0.06189
IDLE/TAXI		2	-0.0	16.40	168.00	0.06401
RUN UP		3	-0.0	24.60	304.00	0.07117
RUN UP-LEAN		4	-0.0	21.10	253.00	0.07436
RUN UP-RICH		5	-0.0	23.40	284.00	0.07491
TAKE-OFF		6	-0.0	109.00	1367.00	0.08198
CLIMB		7	-0.0	77.40	897.00	0.08026
DESCENT		8	-0.0	59.80	678.00	0.08008
APPROACH		9	-0.0	39.80	451.00	0.08031
TAXI		10	-0.0	18.80	172.00	0.06820

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	381.00	-0.00	3.50	6.60	32020.00	16.00	-0.00	-0.00	43.00	-0.00	-0.00
2	448.00	-0.00	3.40	7.20	31937.00	33.00	-0.00	-0.00	45.00	-0.00	-0.00
3	773.00	-0.00	5.90	9.20	3595.00	150.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	729.00	-0.00	6.80	8.90	4264.00	208.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	807.00	-0.00	6.80	9.10	3595.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1155.00	-0.00	9.60	7.70	3651.00	170.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1312.00	-0.00	8.50	8.60	2703.00	243.00	-0.00	-0.00	6.00	-0.00	-0.00
8	1222.00	-0.00	9.00	8.00	2815.00	203.00	-0.00	-0.00	13.00	-0.00	-0.00
9	1099.00	-0.00	9.00	8.00	3316.00	203.00	-0.00	-0.00	13.00	-0.00	-0.00
10	482.00	-0.00	3.50	6.70	44645.00	19.00	-0.00	-0.00	19.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	531.56	278.52	0.0	1574.95	0.40	0.40	6857.13	3592.87	0.0	20316.86	5.15	5.15
2	497.97	267.89	0.0	1656.88	0.79	0.79	8166.64	4393.43	0.0	27172.86	13.02	13.02
3	771.01	26.91	0.0	1889.00	3.22	3.22	18966.77	661.89	0.0	46469.45	79.21	79.21
4	851.87	30.59	0.0	1751.83	4.28	4.28	17974.44	645.52	0.0	36963.64	90.31	90.31
5	844.90	25.58	0.0	1776.54	-0.00	-0.00	19770.57	598.62	0.0	41570.96	-0.00	-0.00
6	1097.89	23.91	0.0	1383.61	3.19	3.19	119669.44	2606.57	0.0	150813.75	348.08	348.08
7	988.58	18.00	0.0	1571.56	4.64	4.64	76516.31	1393.56	0.0	121638.69	359.30	359.30
8	1052.11	18.85	0.0	1469.43	3.90	3.90	62916.43	1127.05	0.0	87871.75	233.10	233.10
9	1049.07	22.14	0.0	1465.18	3.89	3.89	41753.08	881.06	0.0	58314.16	154.69	154.69
10	482.17	352.25	0.0	1450.27	0.43	0.43	9064.84	6622.32	0.0	27264.97	8.08	8.08

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	16.40	3.28	497.97	8166.64	1.633	267.89	4393.43	0.879	0.79	13.02	0.0026
6	0.30	109.00	0.54	1097.89	119669.44	0.598	23.91	2606.57	0.013	3.19	348.08	0.0017
7	5.00	77.40	6.42	988.58	76516.31	6.351	18.00	1393.56	0.116	4.64	359.30	0.0298
9	6.00	39.80	3.98	1049.07	41753.08	4.175	22.14	881.06	0.088	3.89	154.69	0.0155
10	4.00	18.80	1.26	482.17	9064.84	0.607	352.25	6622.32	0.444	0.43	8.08	0.0005
TOTAL FOR CYCLE			15.489			13.365			1.539			0.0502
TOTAL FOR CYCLE/LB FUEL						0.863			0.099			0.0032

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DATE:  81/77/10

TEST ORGANIZATION:  SCOTT/GFN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL
*******************************************************************************************************
ENGINE DATA *******************************************************************************************
                                                                          SERIAL NUMBER:  5059-6-C
     CAL ID NUMBER:  361    ENGINE TYPE AND MODEL:  IO-360-C

                            RATED HORSEPOWER:   210.

     ENGINE TOTAL TIME:     700. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840
*******************************************************************************************************
OPERATIONAL DATA **************************************************************************************
     INLET AIR TEMPERATURE, DEGREES F:  START   76.00   FINISH   79.00

     ATMOSPHERIC PRESSURE:              START   30.23   FINISH   30.23

     INLET AIR HUMIDITY, GRN H2O/LB AIR:   162.00

     RELATIVE HUMIDITY:                      81.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  10

 COMMENTS:


                         CARB.    TEST     ENGINE      MEASURED     MEASURED    CALCULATED
                         HEATER   MODE      RPM        FUEL FLOW    AIR FLOW       F/A
                                                         LB/HR        LB/HR

 IDLE-LOW                          1        -0.0        17.60       236.00      0.06472
 IDLE/TAXI                         2        -0.0        18.80       252.00      0.06843
 RUN UP                            3        -0.0        22.30       291.00      0.07323
 RUN UP-LEAN                       4        -0.0        19.90       273.00      0.07004
 RUN UP-RICH                       5        -0.0        16.40       221.00      0.07166
 TAKE-OFF                          6        -0.0        99.60      1159.00      0.07793
 CLIMB                             7        -0.0        70.30       885.00      0.07298
 DESCENT                           8        -0.0        44.50       546.00      0.07472
 APPROACH                          9        -0.0        23.40       299.00      0.07290
 TAXI                             10        -0.0        17.60       201.00      0.07389


 TEST   EXHAUST    EXHAUST      CO          CO        THC        NO        NO         NO     ALDEHYDES   SMOKE   PARTICULATES
 MODE     GAS        GAS       (DRY)         2       (DRY)     (DRY)        2          X       (DRY)
         TEMP     PRESSURE   PERCENT V    (DRY)      PPMV      PPMV      (DRY)      (DRY)
       DEGREES F    PSIA               PERCENT V                          PPMV       PPMV

  1     751.00     -0.00       2.80       10.50     8571.00     48.00     -0.00     -0.00     26.00     -0.00      -0.00
  2     762.00     -0.00       3.40       11.10     5042.00     86.00     -0.00     -0.00     20.00     -0.00      -0.00
  3     874.00     -0.00       4.80       11.00     2409.00    267.00     -0.00     -0.00     -0.00     -0.00      -0.00
  4     874.00     -0.00       3.20       12.00     2185.00    210.00     -0.00     -0.00     -0.00     -0.00      -0.00
  5     886.00     -0.00       3.90       11.70     1513.00    167.00     -0.00     -0.00     -0.00     -0.00      -0.00
  6    1155.00     -0.00       8.00        8.40     4538.00    775.00     -0.00     -0.00     -0.00     -0.00      -0.00
  7    1177.00     -0.00       5.80        9.90     2017.00    620.00     -0.00     -0.00      7.00     -0.00      -0.00
  8    1043.00     -0.00       6.60        9.30     2241.00    401.00     -0.00     -0.00     10.00     -0.00      -0.00
  9     863.00     -0.00       5.40       10.20     3081.00    286.00     -0.00     -0.00      8.00     -0.00      -0.00
 10     628.00     -0.00       3.60       10.00    25209.00     67.00     -0.00     -0.00     27.00     -0.00      -0.00


 TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 MODE      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
         LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
        LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

  1     399.56      70.05       0.0      2354.26      1.13       1.13     7032.30    1232.87      0.0     41435.01     19.80      19.80
  2     457.79      38.88       0.0      2348.28      1.90       1.90     8606.47     730.96      0.0     44147.67     35.76      35.76
  3     604.53      17.38       0.0      2176.73      5.52       5.52    13480.90     387.49      0.0     48540.98    123.17     123.17
  4     419.29      16.40       0.0      2470.47      4.52       4.52     8343.77     326.29      0.0     49162.27     89.94      89.94
  5     500.21      11.11       0.0      2357.81      3.52       3.52     8203.39     182.27      0.0     38668.13     57.70      57.70
  6     958.95      31.15       0.0      1582.05     15.26      15.26    95510.94    3102.94      0.0    157572.50   1519.80    1519.80
  7     736.86      14.68       0.0      1976.20     12.94      12.94    51801.38    1031.73      0.0    138927.06    909.55     909.55
  8     826.93      16.08       0.0      1830.83      8.25       8.25    36798.50     715.61      0.0     81471.81    367.24     367.24
  9     685.77      22.41       0.0      2035.27      5.97       5.97    16046.96     524.37      0.0     47625.29    139.60     139.60
 10     451.14     180.93       0.0      1969.02      1.38       1.38     7940.13    3184.39      0.0     34654.80     24.27      24.27


                                                    LTO CYCLE EMISSIONS

 TEST   TIME IN   MEASURED    FUEL       CO         CO         CO         HC         HC         HC         NO         NO         NO
 MODE    MODE    FUEL FLOW    USED     LB/1K      LB/1K    EMISSION    LB/1K      LB/1K    EMISSION    LB/1K      LB/1K    EMISSION
         MIN.      LB/HR      LBS.    LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.

  2     12.00      18.80      3.76     457.79    8606.47     1.721     38.88     730.96     0.146      1.90      35.76     0.0072
  6      0.30      99.60      0.50     958.95   95510.94     0.478     31.15    3102.94     0.016     15.26    1519.80     0.0076
  7      5.00      70.30      5.83     736.86   51801.38     4.300     14.68    1031.73     0.086     12.94     909.55     0.0755
  9      6.00      23.40      2.34     685.77   16046.96     1.605     22.41     524.37     0.052      5.97     139.60     0.0140
 10      4.00      17.60      1.18     451.14    7940.13     0.532    180.93    3184.39     0.213      1.38      24.27     0.0016

 TOTAL FOR CYCLE                    13.612                         8.635                            0.513                          0.1058

 TOTAL FOR CYCLE/LB FUEL                                           0.634                            0.038                          0.0078
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DATE:   8/17/61

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:  362    ENGINE TYPE AND MODEL:  IO-360-C                    SERIAL NUMBER:   50591-6CA

                            RATED HORSEPOWER:   210.

     ENGINE TOTAL TIME:    700. HRS

     FUEL: AV GAS 100/130             FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   79.00   FINISH   80.00

     ATMOSPHERIC PRESSURE:              START   30.24   FINISH   30.24

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.02

     RELATIVE HUMIDITY:                      75.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:     7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  10

COMMENTS:



                    CARB.     TEST      ENGINE       MEASURED       MEASURED      CALCULATED
                    HEATER    MODE       RPM         FUEL FLOW      AIR FLOW         F/A
                                                      LB/HR          LB/HR

IDLE-LOW                        1        -0.0          21.10         257.00        0.06052
IDLE/TAXI                       2        -0.0          19.90         250.00        0.06695
RUN UP                          3        -0.0          22.30         292.00        0.06991
RUN UP-LEAN                     4        -0.0          19.90         269.00        0.06836
RUN UP-RICH                     5        -0.0          18.80         252.00        0.06782
TAKE-OFF                        6        -0.0          93.80        1110.00        0.07768
CLIMB                           7        -0.0          63.30          82.00        0.07179
DESCENT                         8        -0.0          41.00         509.00        0.07199
APPROACH                        9        -0.0          27.00         335.00        0.06999
TAXI                           10        -0.0          19.90         234.00        0.06737


 TEST    EXHAUST     EXHAUST      CO         CO          THC        NO        NO        NO      ALDEHYDES    SMOKE     PARTICULATES
 MODE      GAS         GAS       (DRY)        2         (DRY)     (DRY)        2         X        (DRY)
          TEMP      PRESSURE   PERCENT V    (DRY)       PPMV      PPMV      (DRY)     (DRY)
        DEGREES F     PSIA              PERCENT V                           PPMV      PPMV

   1     560.00      -0.00       2.30       9.20   16636.00     84.00     -0.00     -0.00     46.00      -0.00        -0.00
   2     605.00      -0.00       3.40      10.10   11146.00     79.00     -0.00     -0.00     30.00      -0.00        -0.00
   3     830.00      -0.00       4.40      10.60    2884.00    269.00     -0.00     -0.00     -0.00      -0.00        -0.00
   4     785.00      -0.00       3.60      11.20    1941.00    163.00     -0.00     -0.00     -0.00      -0.00        -0.00
   5     852.00      -0.00       3.70      11.00    1608.00    153.00     -0.00     -0.00     -0.00      -0.00        -0.00
   6    1155.00      -0.00       7.60       8.80    4325.00    336.00     -C.00     -0.00     -0.00      -0.00        -0.00
   7    1211.00      -0.00       5.00      10.50    1885.00    791.00     -0.00     -0.00     13.00      -0.00        -0.00
   8    1076.00      -0.00       6.10       9.30    2440.00    456.00     -C.00     -0.00     11.00      -0.00        -0.00
   9     919.00      -0.00       5.60       9.20    4048.00    269.00     -0.00     -0.00     10.00      -0.00        -0.00
  10     673.00      -0.00       3.60       9.20   18466.00     56.00     -0.00     -0.00     29.00      -0.00        -0.00


 TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 MODE       CO         HC        NO2        CO2         NO         NOX        CO         HC         NO2        CO2         NO         NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1     352.98     146.22       0.0     2218.47       2.12       2.12    7447.95    3085.34      0.0    46809.66      44.68      44.68
   2     470.00      88.24       0.0     2193.69       1.79       1.79    9352.91    1756.03      0.0    43654.36      35.70      35.70
   3     581.42      21.83       0.0     2200.82       5.84       5.84   12965.73     486.73      0.0    49078.20     130.20     130.20
   4     485.05      14.98       0.0     2371.03       3.61       3.61    9652.43     298.06      0.0    47183.55      71.79      71.79
   5     502.99      12.52       0.0     2349.58       3.42       3.42    9456.25     235.37      0.0    44172.10      64.23      64.23
   6     912.15      29.73       0.0     1659.49       6.62       6.62   85559.69    2788.61      0.0   155659.81     621.32     621.32
   7     643.86      13.90       0.0     2124.46      16.73      16.73   40756.21     880.00      0.0   134477.94    1059.06    1059.06
   8     787.74      18.05       0.0     1887.01       9.67       9.67   32297.39     739.90      0.0    77367.56     396.57     396.57
   9     744.06      30.80       0.0     1920.65       5.87       5.87   20089.66     831.71      0.0    51857.42     158.51     158.51
  10     496.55     145.88       0.0     1993.84       1.27       1.27    9881.44    2902.93      0.0    39677.47      25.25      25.25


                                                     LTO CYCLE EMISSIONS

 TEST    TIME IN    MEASURED      FUEL       CO         CO          CO         HC         HC         HC         NO         NO         NO
 MODE      MODE     FUEL FLOW     USED      LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION
           MIN.       LB/HR       LBS.     LB FUFL     HOURS       LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.

   2      12.00       19.90       3.98     470.00    9352.91      1.871      88.24    1756.03      0.351       1.79      35.70     0.0071
   6       0.30       93.80       0.47     912.15   85559.69      0.428      29.73    2788.61      0.014       6.62     621.32     0.0031
   7       5.00       63.30       5.25     643.86   40756.21      3.383      13.90     880.00      0.073      16.73    1059.06     0.0879
   9       6.00       27.00       2.70     744.06   20089.66      2.009      30.80     831.71      0.083       5.87     158.51     0.0159
  10       4.00       19.90       1.33     496.55    9881.44      0.662     145.88    2902.93      0.194       1.27      25.25     0.0017

TOTAL FOR CYCLE                  13.736                           8.352                           0.716                           0.1157

TOTAL FOR CYCLE/LB FUEL                                           0.608                           0.052                           0.0084
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DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 364 ENGINE TYPE AND MODEL: IO-360-C SERIAL NUMBER: 50591-6-CC

RATED HORSEPOWER: 210.

ENGINE TOTAL TIME: 700. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 78.00 FINISH 78.00

ATMOSPHERIC PRESSURE: START 30.21 FINISH 30.21

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 79.00 PERCENT

SAMPLE LINE: TEMPERATURE, CEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	15.20	157.00	0.07829
IDLE/TAXI		2	-0.0	16.40	185.00	0.07736
RUN UP		3	-0.0	25.80	311.00	0.07765
RUN UP-LEAN		4	-0.0	24.60	299.00	0.07677
RUN UP-RICH		5	-0.0	22.30	276.00	0.07478
TAKE-OFF		6	-0.0	93.80	1185.00	0.07518
CLIMB		7	-0.0	64.50	838.00	0.07321
DESCENT		8	-0.0	45.70	577.00	0.07512
APPROACH		9	-0.0	25.80	337.00	0.07216
TAXI		10	-0.0	18.80	233.00	0.07207

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	617.00	-0.00	4.50	8.90	35935.00	22.00	-0.00	-0.00	40.00	-0.00	-0.00
2	673.00	-0.00	5.60	9.30	19132.00	38.00	-0.00	-0.00	28.00	-0.00	-0.00
3	975.00	-0.00	7.20	9.30	3660.00	137.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	953.00	-0.00	6.90	9.30	4769.00	80.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	998.00	-0.00	6.30	9.70	2773.00	108.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1312.00	-0.00	5.70	10.30	4104.00	916.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1390.00	-0.00	5.00	10.80	2218.00	675.00	-0.00	-0.00	20.00	-0.00	-0.00
8	1278.00	-0.00	6.00	10.40	26.60	434.00	-0.00	-0.00	10.00	-0.00	-0.00
9	942.00	-0.00	4.70	10.80	2939.00	395.00	-0.00	-0.00	22.00	-0.00	-0.00
10	807.00	-0.00	4.00	10.60	11645.00	62.00	-0.00	-0.00	27.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	534.97	244.67	0.0	1662.44	0.43	0.43	8131.58	3718.99	0.0	25269.15	6.53	6.53
2	672.88	131.66	0.0	1755.79	0.75	0.75	11035.27	2159.24	0.0	28794.93	12.30	12.30
3	862.43	25.11	0.0	1750.29	2.70	2.70	22250.59	647.79	0.0	45157.55	69.54	69.54
4	835.86	33.09	0.0	1770.14	1.59	1.59	20562.26	813.94	0.0	43545.42	39.16	39.16
5	781.92	19.71	0.0	1891.60	2.20	2.20	17436.70	439.56	0.0	42182.66	49.10	49.10
6	701.71	28.94	0.0	1992.32	18.52	18.52	65820.31	2714.18	0.0	186879.06	1737.40	1737.40
7	630.46	16.02	0.0	2139.70	13.98	13.98	40664.91	1033.13	0.0	138010.50	901.73	901.73
8	738.99	[illegible]	0.0	2012.61	8.78	8.78	33771.85	8.57	0.0	91976.13	401.25	401.25
9	601.19	21.53	0.0	2170.57	8.30	8.30	15510.64	555.49	0.0	56000.78	214.12	214.12
10	512.60	85.47	0.0	2134.35	1.31	1.31	9636.94	1606.81	0.0	40125.76	24.54	24.54

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	16.40	3.28	672.88	11035.27	2.207	131.66	2159.24	0.432	0.75	12.30	0.0025
6	0.30	93.80	0.47	701.71	65820.31	0.329	28.94	2714.18	0.014	18.52	1737.40	0.0087
7	5.00	64.50	5.35	630.46	40664.91	3.375	16.02	1033.13	0.086	13.98	901.73	0.0748
9	6.00	25.80	2.58	601.19	15510.64	1.551	21.53	555.49	0.056	8.30	214.12	0.0214
10	4.00	18.80	1.26	512.60	9636.94	0.646	85.47	1606.81	0.108	1.31	24.54	0.0016
TOTAL FOR CYCLE			12.942			8.108			0.694			0.1090
TOTAL FOR CYCLE/LB FUEL						0.626			0.054			0.0084

DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEM AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 365 ENGINE TYPE AND MODEL: IO-360-C SERIAL NUMBER: 55651-6-D

RATED HORSEPOWER: 210.

ENGINE TOTAL TIME: 700. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 79.00 FINISH 81.00

ATMOSPHERIC PRESSURE: START 30.21 FINISH 30.21

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 74.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	19.90	168.00	0.08591
IDLE/TAXI		2	-0.0	21.10	208.00	0.08043
RUN UP		3	-0.0	31.60	381.00	0.07723
RUN UP-LEAN		4	-0.0	35.20	437.00	0.07668
RUN UP-RICH		5	-0.0	22.30	273.00	0.07641
TAKE-OFF		6	-0.0	96.10	1118.00	0.07295
CLIMB		7	-0.0	66.80	775.00	0.07742
DESCENT		8	-0.0	49.20	547.00	0.07968
APPROACH		9	-0.0	23.80	332.00	0.08406
TAXI		10	-0.0	21.10	158.00	0.08514

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	673.00	-0.00	5.30	7.20	69010.00	29.00	-0.00	-0.00	37.00	-0.00	-0.00
2	717.00	-0.00	5.10	8.40	39137.00	51.00	-0.00	-0.00	46.00	-0.00	-0.00
3	1031.00	-0.00	7.10	9.20	4675.00	271.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1020.00	-0.00	6.30	10.00	4131.00	160.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1065.00	-0.00	6.60	9.50	5164.00	194.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1300.00	-0.00	7.40	7.90	4457.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1312.00	-0.00	8.10	8.30	3370.00	213.00	-0.00	-0.00	19.00	-0.00	-0.00
8	1211.00	-0.00	9.20	7.50	4566.00	164.00	-0.00	-0.00	28.00	-0.00	-0.00
9	1110.00	-0.00	9.40	7.10	15655.00	88.00	-0.00	-0.00	57.00	-0.00	-0.00
10	762.00	-0.00	4.80	6.20	72566.00	58.00	-0.00	-0.00	61.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	578.74	375.30	0.0	1235.31	0.52	0.52	11516.89	7468.42	0.0	24582.73	10.35	10.35
2	591.67	260.04	0.0	1531.19	0.97	0.97	12484.27	5486.88	0.0	32308.03	20.51	20.51
3	855.44	32.26	0.0	1741.64	5.36	5.36	27032.03	1019.41	0.0	55035.93	169.48	169.48
4	761.53	28.60	0.0	1899.26	3.18	3.18	26805.75	1006.67	0.0	66853.75	111.82	111.82
5	802.43	35.96	0.0	1814.79	3.87	3.87	17894.24	801.86	0.0	40469.83	86.40	86.40
6	949.45	32.75	0.0	1592.60	-0.00	-0.00	91242.00	3147.39	0.0	153048.31	-0.00	-0.00
7	977.71	23.30	0.0	1574.13	4.22	4.22	65310.84	1556.24	0.0	105151.69	282.10	282.10
8	1083.32	30.79	0.0	1387.62	3.17	3.17	53299.54	1515.01	0.0	68270.81	156.06	156.06
9	1051.19	100.27	0.0	1247.52	1.62	1.62	25018.22	2386.31	0.0	29691.03	38.47	38.47
10	531.16	459.90	0.0	1077.98	1.05	1.05	11207.41	9703.82	0.0	22745.44	22.24	22.24

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	21.10	4.22	591.67	12484.27	2.497	260.04	5486.88	1.097	0.97	20.51	0.0041
6	0.30	96.10	0.48	949.45	91242.00	0.456	32.75	3147.39	0.016	-0.00	-0.00	-0.0000
7	5.00	66.80	5.54	977.71	65310.84	5.421	23.30	1556.24	0.129	4.22	282.10	0.0234
9	6.00	23.80	2.38	1051.19	25018.22	2.502	100.27	2386.31	0.239	1.62	38.47	0.0038
10	4.00	21.10	1.41	531.16	11207.41	0.751	459.90	9703.82	0.650	1.05	22.24	0.0015
TOTAL FOR CYCLE			14.039			11.627			2.131			-0.0000
TOTAL FOR CYCLE/LB FUEL						0.828			0.152			-0.0000

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DATE:   7/28/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL
*************************************************************************************************************
ENGINE DATA *************************************************************************************************
     CAL ID NUMBER:  253    ENGINE TYPE AND MODEL:  IO-470-C                    SERIAL NUMBER:   71018-7-CA

                            RATED HORSEPOWER:   250.

     ENGINE TOTAL TIME:     761. HRS

     FUEL: AV GAS 100/130          FUEL H/C RATIO:    1.840
*************************************************************************************************************
OPERATIONAL DATA ********************************************************************************************
     INLET AIR TEMPERATURE, DEGREES F:  START   71.00   FINISH   76.00

     ATMOSPHERIC PRESSURE:              START   30.15   FINISH   30.15

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     60.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, CEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  10

 COMMENTS:



                        CARB.    TEST      ENGINE       MEASURED       MEASURED       CALCULATED
                        HEATER   MODE      RPM          FUEL FLOW      AIR FLOW          F/A
                                                          LB/HR          LB/HR

                                   1       -0.0         19.30          108.00         0.06856
 IDLE-LOW                          2       -0.0         26.40          233.00         0.07168
 IDLE/TAXI                         3       -0.0         38.70          435.00         0.06768
 RUN UP                            4       -0.0         38.70          445.00         0.06568
 RUN UP-LEAN                       5       -0.0         31.60          362.00         0.06510
 RUN UP-RICH                       6       -0.0        107.20         1296.00         0.06573
 TAKE-OFF                          7       -0.0         86.10         1038.00         0.06435
 CLIMB                             8       -0.0         73.80          872.00         0.06378
 DESCENT                           9       -0.0         52.70          622.00         0.06238
 APPROACH                         10       -0.0         33.40          255.00         0.07107
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                                                                                  ALDEHYDES    SMOKE    PARTICULATES
                                                                 NO        NO      (DRY)
 TEST   EXHAUST   EXHAUST     CO        CO       THC      NO        2         X
 MODE    GAS       GAS       (DRY)       2       (DRY)    (DRY)   (DRY)     (DRY)
         TEMP     PRESSURE  PERCENT V  (DRY)     PPMV     PPMV     PPMV      PPMV
       DEGREES F   PSIA               PERCENT V

  1     359.00    -0.00      4.40      2.90   71867.00     2.00   -0.00     -0.00     69.00      -0.00      -0.00
  2     560.00    -0.00      6.70      5.30   32968.00     7.00   -0.00     -0.00     41.00      -0.00      -0.00
  3     986.00    -0.00      7.60      6.60    3228.00    52.00   -0.00     -0.00     -0.00      -0.00      -0.00
  4     964.00    -0.00      6.90      6.90    3173.00    42.00   -0.00     -0.00     -0.00      -0.00      -0.00
  5     975.00    -0.00      7.00      6.70    2786.00    41.00   -0.00     -0.00     -0.00      -0.00      -0.00
  6    1412.00    -0.00      6.10      7.90    1959.00   191.00   -0.00     -0.00     -0.00      -0.00      -0.00
  7    1401.00    -0.00      6.00      7.70    1848.00   331.00   -0.00     -0.00      7.00      -0.00      -0.00
  8    1312.00    -0.00      6.30      7.20    2209.00   234.00   -0.00     -0.00      6.03      -0.00      -0.00
  9    1222.00    -0.00      6.20      7.00    2179.00   201.00   -0.00     -0.00      6.00      -0.00      -0.00
 10     706.00    -0.00      6.60      4.10   43865.00    16.00   -0.00     -0.00     30.00      -0.00      -0.00


 TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
         LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
       * LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  1     613.60    573.99     0.0      635.43     0.05      0.05   11942.46  11078.06    0.0    12263.82      0.88      0.88
  2     884.86    249.37     0.0     1099.80     0.15      0.15   23360.36   6583.29    0.0    29034.82      4.01      4.01
  3    1057.22     25.72     0.0     1442.56     1.19      1.19   40914.38    995.27    0.0    55827.01     45.98     45.98
  4     987.41     26.01     0.0     1551.45     0.99      0.99   38212.92   1006.41    0.0    60041.07     38.21     38.21
  5    1011.66     23.06     0.0     1521.43     0.97      0.97   31968.57    728.70    0.0    48077.09     30.76     30.76
  6     868.10     15.97     0.0     1766.46     4.46      4.46   93060.00   1711.64    0.0   189364.56    478.62    478.62
  7     873.00     15.40     0.0     1760.32     7.91      7.91   75165.13   1325.91    0.0   151563.31    681.10    681.10
  8     926.99     19.37     0.0     1664.58     5.66      5.66   68411.81   1429.80    0.0   122846.06    417.38    417.38
  9     933.49     18.79     0.0     1655.97     4.97      4.97   49194.84    990.22    0.0    87269.81    261.97    261.97
 10     883.81    336.42     0.0      862.65     0.35      0.35   29519.12  11236.30    0.0    28612.54     11.75     11.75


                                              LTO CYCLE EMISSIONS

                                                                                          HC        NO        NO        NO
 TEST   TIME IN   MEASURED    FUEL      CO        CO        CO        HC        HC     EMISSION   LB/1K     LB/1K   EMISSION
 MODE    MODE     FUEL FLOW   USED     LB/1K     LB/1K   EMISSION    LB/1K     LB/1K     LBS.    LB FUEL    HOURS     LBS.
         MIN.      LB/HR      LBS.    LB FUEL    HOURS     LBS.     LB FUEL    HOURS

  2     12.00     26.40      5.28    884.86   23360.36    4.672    249.37   6583.29    1.317     0.15      4.01    0.0008
  6      0.30    107.20      0.54    868.10   93060.00    0.465     15.97   1711.64    0.009     4.46    478.62    0.0024
  7      5.00     86.10      7.15    873.00   75165.13    6.239     15.40   1325.91    0.110     7.91    681.10    0.0565
  9      6.00     52.70      5.27    933.49   49194.84    4.919     18.79    990.22    0.099     4.97    261.97    0.0262
 10      4.00     33.40      2.24    883.81   29519.12    1.978    336.42  11236.30    0.753     0.35     11.75    0.0008

 TOTAL FOR CYCLE                20.470                        18.273                       2.287                        0.0867

 TOTAL FOR CYCLE/LB FUEL                                       0.893                       0.112                        0.0042
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DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 254 ENGINE TYPE AND MODEL: IO-470-C SERIAL NUMBER: 71018-7-C8

RATED HORSEPOWER: 250.

ENGINE TOTAL TIME: 761. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 79.00 FINISH 80.00

ATMOSPHERIC PRESSURE: START 30.15 FINISH 30.15

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 44.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	5.30	39.00	0.06223
IDLE/TAXI		2	-0.0	10.50	117.00	0.06577
RUN UP		3	-0.0	26.40	292.00	0.06689
RUN UP-LEAN		4	-0.0	22.90	263.00	0.05335
RUN UP-RICH		5	-0.0	22.90	258.00	0.06236
TAKE-OFF		6	-0.0	66.80	795.00	0.06505
CLIMB		7	-0.0	61.50	744.00	0.06293
DESCENT		8	-0.0	59.80	713.00	0.06405
APPROACH		9	-0.0	36.90	433.00	0.06438
TAXI		10	-0.0	14.10	115.00	0.07482

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	370.00	-0.00	4.30	4.10	48212.00	3.00	-0.00	-0.00	53.00	-0.00	-0.00
2	639.00	-0.00	5.30	7.40	14770.00	28.00	-0.00	-0.00	35.00	-0.00	-0.00
3	964.00	-0.00	7.70	6.30	3344.00	69.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	897.00	-0.00	5.90	5.50	-0.00	49.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	964.00	-0.00	6.90	6.20	2620.00	56.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1368.00	-0.00	6.30	7.50	2229.00	281.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1390.00	-0.00	5.80	7.60	1728.00	319.00	-0.00	-0.00	8.00	-0.00	-0.00
8	1345.00	-0.00	6.20	7.40	2006.00	281.00	-0.00	-0.00	9.00	-0.00	-0.00
9	1211.00	-0.00	6.50	7.10	2508.00	205.00	-0.00	-0.00	22.00	-0.00	-0.00
10	695.00	-0.00	7.60	4.60	37120.00	16.00	-0.00	-0.00	33.00	-0.00	

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	657.05	421.92	0.0	984.36	0.08	0.08	3482.37	2236.18	0.0	5217.09	0.40	0.40
2	755.25	120.54	0.0	1656.87	0.66	0.66	7930.17	1265.71	0.0	17397.09	6.88	6.88
3	1085.21	26.99	0.0	1395.09	1.60	1.60	28649.49	712.59	0.0	36830.27	42.17	42.17
4	1045.56	-0.00	0.0	1531.43	1.43	1.43	23943.31	-0.00	0.0	35069.81	32.66	32.66
5	1043.23	22.69	0.0	1472.86	1.39	1.39	23889.92	519.53	0.0	33728.39	31.85	31.85
6	907.62	18.39	0.0	1697.71	6.65	6.65	60629.03	1228.56	0.0	113406.94	444.19	444.19
7	863.30	14.73	0.0	1777.40	7.80	7.80	53092.76	905.93	0.0	109309.81	479.64	479.64
8	907.60	16.82	0.0	1702.06	6.76	6.76	54274.61	1005.73	0.0	101782.94	404.05	404.05
9	948.07	20.95	0.0	1627.13	4.91	4.91	34983.78	773.08	0.0	60041.24	181.23	181.23
10	964.92	269.92	0.0	917.64	0.33	0.33	13605.35	3805.83	0.0	12938.75	4.70	4.70

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	10.50	2.10	755.25	7930.17	1.586	120.54	1265.71	0.253	0.66	6.88	0.0014
6	0.30	66.80	0.33	907.62	60629.03	0.303	18.39	1228.56	0.006	6.65	444.19	0.0022
7	5.00	61.50	5.10	863.30	53092.76	4.407	14.73	905.93	0.075	7.80	479.64	0.0398
9	6.00	36.90	3.69	948.07	34983.78	3.498	20.95	773.08	0.077	4.91	181.23	0.0181
10	4.00	14.10	0.94	964.92	13605.35	0.912	269.92	3805.83	0.255	0.33	4.70	0.0003
TOTAL FOR CYCLF			12.173			10.706			0.667			0.0618
TOTAL FOR CYCLE/LB FUEL						0.879			0.055			0.0051

DATE: 7/30/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 255 ENGINE TYPE AND MODEL: IO-470-C SERIAL NUMBER: 71018-7-CC

RATED HORSEPOWER: 250.

ENGINE TOTAL TIME: 761. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 80.00 FINISH 80.00

ATMOSPHERIC PRESSURE: START 30.15 FINISH 30.15

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 43.CC PERCFNT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	5.30	30.00	0.07204
IDLE/TAXI		2	-0.0	7.00	63.00	0.07133
RUN UP		3	-0.0	19.30	210.00	0.06572
RUN UP-LEAN		4	-0.0	22.90	264.00	0.06469
RUN UP-RICH		5	-0.0	22.90	264.00	0.06321
TAKF-OFF		6	-0.0	103.70	1200.00	0.06476
CLIMB		7	-0.0	79.10	966.00	0.06141
DESCENT		8	-0.0	63.30	748.00	0.C6190
APPROACH		9	-0.0	38.70	456.00	0.06252
TAXI		10	-0.0	5.30	42.00	C.07347

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TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	460.00	-0.00	4.20	3.40	76585.00	3.00	-0.00	-0.00	94.00	-0.00	-0.00
2	751.00	-0.00	6.70	5.40	31293.00	14.00	-0.00	-0.00	45.00	-0.00	-0.00
3	1099.00	-0.00	7.80	5.80	4502.00	57.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1099.00	-0.00	6.60	6.90	4063.00	42.00	-0.00	-0.00	-0.00	-0.00	-0.C0
5	1143.00	-0.00	6.60	6.70	2745.00	40.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1401.00	-0.00	6.80	6.90	2196.00	216.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1469.00	-0.00	5.50	7.60	1482.00	298.00	-0.00	-0.00	19.00	-0.00	-0.00
8	1368.00	-0.00	6.10	7.00	2141.00	240.00	-0.00	-0.00	8.00	-0.00	-0.00
9	1334.00	-0.00	6.20	7.00	2470.00	191.00	-0.00	-0.00	13.00	-0.00	-0.00
10	830.00	-0.00	6.30	4.80	45457.00	14.00	-0.00	-0.00	64.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	556.08	580.74	0.0	707.31	0.07	0.07	2947.24	3077.90	0.0	3748.72	0.35	0.35
2	888.78	237.75	0.0	1125.52	0.31	0.31	6221.49	1664.23	0.0	7878.65	2.14	2.14
3	1121.54	37.07	0.0	1310.34	1.35	1.35	21645.66	715.53	0.0	25289.63	25.98	25.98
4	958.81	33.81	0.0	1574.99	1.00	1.00	21956.82	774.14	0.0	36067.23	22.95	22.95
5	982.25	23.40	0.0	1566.72	0.98	0.98	22493.50	535.80	0.0	35877.82	22.39	22.39
6	986.92	18.25	0.0	1573.48	5.15	5.15	102344.06	1892.91	0.0	163170.25	533.98	533.98
7	838.70	12.94	0.0	1820.94	7.46	7.46	66341.25	1023.80	0.0	144036.56	590.42	590.42
8	925.59	18.61	0.0	1668.89	5.98	5.98	58589.96	1177.76	0.0	105640.31	378.64	378.64
9	931.47	21.25	0.0	1652.39	4.71	4.71	36047.82	822.49	0.0	63947.51	182.41	182.41
10	813.48	336.17	0.0	973.84	0.30	0.30	4311.45	1781.67	0.0	5161.33	1.57	1.57

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	7.00	1.40	888.78	6221.49	1.244	237.75	1664.23	0.333	0.31	2.14	0.0004
6	0.30	103.70	0.52	986.92	102344.06	0.512	18.25	1892.91	0.009	5.15	533.98	0.0027
7	5.00	79.10	6.57	838.70	66341.25	5.506	12.94	1023.80	0.085	7.46	590.42	0.0490
9	6.00	38.70	3.87	931.47	36047.82	3.605	21.25	822.49	0.082	4.71	182.41	0.0182
10	4.00	5.30	0.36	813.48	4311.45	0.289	336.17	1781.67	0.119	0.30	1.57	0.0001
TOTAL FOR CYCLE			12.709			11.156			0.629			0.0704
TOTAL FOR CYCLE/LB FUEL						0.878			0.049			0.0055

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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ************************************************************************************************************

     CAL ID NUMBER:  193    ENGINE TYPE AND MODEL:  IO-470-V                 SERIAL NUMBER:   170012-7-V-RA

                            RATED HORSEPOWER:   260.

     ENGINE TOTAL TIME:    971. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA *******************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   85.00   FINISH   85.00

     ATMOSPHERIC PRESSURE:              START   30.23   FINISH   30.23

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                    47.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  10

COMMENTS:
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                   CARB.     TEST       ENGINE       MEASURED        MEASURED        CALCULATED
                   HEATER    MODE       RPM          FUEL FLOW       AIR FLOW        F/A
                                                     LB/HR           LB/HR

IDLE-LOW                       1        -0.0          25.20          272.00          0.03766
IDLE/TAXI                      2        -0.0          29.30          319.00          0.07404
RUN UP                         3        -0.0          41.00          459.00          0.08208
RUN UP-LEAN                    4        -0.0          41.00          475.00          0.07812
RUN UP-RICH                    5        -0.0          41.00          471.00          0.07909
TAKE-OFF                       6        -0.0         111.30         1317.00          0.08056
CLIMB                          7        -0.0          80.90          977.00          0.07565
DESCENT                        8        -0.0       [illegible]       896.00          0.07781
APPROACH                       9        -0.0          63.30          731.00          0.07941
TAXI                          10        -0.0          29.30          312.00          0.05872
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 TEST   EXHAUST     EXHAUST      CO          CO          THC        NO         NO         NO       ALDEHYDES    SMOKE    PARTICULATES
 MODE     GAS         GAS       (DRY)         2         (DRY)      (DRY)        2          X        (DRY)
          TEMP      PRESSURE   PERCENT V    (DRY)        PPMV       PPMV      (DRY)      (DRY)
       DEGREES F      PSIA               PERCENT V                            PPMV       PPMV

   1    390.00       -0.00       2.60        4.20     12100.00      5.00      -0.00      -0.00      54.00       -0.00       -0.00
   2    852.00       -0.00       6.50        7.80     16806.00     21.00      -0.00      -0.00      50.00       -0.00       -0.00
   3   1199.00       -0.00       9.10        8.10      5210.00     82.00      -0.00      -0.00      -0.00       -0.00       -0.00
   4   1256.00       -0.00       7.90        8.50      5042.00     63.00      -0.00      -0.00      -0.00       -0.00       -0.00
   5   1256.00       -0.00       8.20        8.40      5042.00     63.00      -0.00      -0.00      -0.00       -0.00       -0.00
   6   1469.00       -0.00       7.50        9.40      6050.00    163.00      -0.00      -0.00      -0.00       -0.00       -0.00
   7   1446.00       -0.00       7.00        9.10      3593.00    166.00      -0.00      -0.00      29.00       -0.00       -0.00
   8   1368.00       -0.00       7.80        8.70      3529.00    122.00      -0.00      -0.00      13.00       -0.00       -0.00
   9   1323.00       -0.00       8.30        8.50      3809.00    133.00      -0.00      -0.00      10.00       -0.00       -0.00
  10    673.00       -0.00       5.00        6.00     15798.00     41.00      -0.00      -0.00      36.00       -0.00       -0.00
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 TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1     655.76     174.78       0.0     1664.40       0.21       0.21   16525.05    4404.54      0.0    41942.79      5.22       5.22
   2     821.72     121.68       0.0     1549.32       0.44       0.44   24076.28    3565.22      0.0    45395.13     12.78      12.78
   3    1037.42      34.02       0.0     1450.90       1.54       1.54   42534.27    1394.70      0.0    59486.83     62.96      62.96
   4     944.14      34.51       0.0     1596.12       1.24       1.24   38709.55    1414.94      0.0    65440.75     50.71      50.71
   5     968.53      34.11       0.0     1558.89       1.22       1.27   39709.71    1398.40      0.0    63914.66     50.11      50.11
   6     865.57      39.99       0.0     1704.53       3.09       3.09   96337.56    4450.77      0.0   189714.50    343.91     343.91
   7     861.28      22.50       0.0     1759.25       3.35       3.35   69677.63    1820.29      0.0   142323.00    271.41     271.41
   8     935.02      24.23       0.0     1638.64       2.40       2.40   71248.56    1846.20      0.0   124864.56    183.05     183.05
   9     975.96      25.65       0.0     1570.41       2.57       2.57   61778.50    1623.74      0.0    99406.81    162.60     162.60
  10     802.97     145.30       0.0     1513.97       1.08       1.08   23526.95    4257.38      0.0    44359.34     31.69      31.69
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                                                          LTO CYCLE EMISSIONS

 TEST    TIME IN    MEASURED     FUEL        CO          CO          CO         HC         HC          HC         NO         NO         NO
 MODE     MODE      FUEL FLOW    USED       LB/1K       LB/1K     EMISSION     LB/1K      LB/1K     EMISSION     LB/1K      LB/1K    EMISSION
          MIN.       LB/HR       LBS.      LB FUEL      HOURS       LBS.      LB FUEL     HOURS       LBS.      LB FUEL     HOURS      LBS.

   2     12.00       29.30       5.86      821.72    24076.28     4.815      121.68    3565.22     0.713       0.44      12.78     0.0026
   6      0.30      111.30       0.56      865.57    96337.56     0.482       39.99    4450.77     0.022       3.09     343.91     0.0017
   7      5.00       80.90       6.71      861.28    69677.63     5.783       22.50    1820.29     0.151       3.35     271.41     0.0225
   9      6.00       63.30       6.33      975.96    61778.50     6.178       25.65    1623.74     0.162       2.57     162.60     0.0163
  10      4.00       29.30       1.96      802.97    23526.95     1.576      145.30    4257.38     0.285       1.08      31.69     0.0021

TOTAL FOR CYCLE                 21.424                          18.834                            1.334                             0.0452

TOTAL FOR CYCLE/LB FUEL                                          0.879                            0.062                             0.0021
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DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 194 ENGINE TYPE AND MODEL: IO-470-V SERIAL NUMBER: 170012-7-V-RB

RATED HORSEPOWER: 260.

ENGINE TOTAL TIME: 971. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 94.00 FINISH 94.00

ATMOSPHERIC PRESSURE: START 30.23 FINISH 30.23

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 34.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	24.00	229.00	0.04229
IDLE/TAXI		2	-0.0	29.30	339.00	0.06563
RUN UP		3	-0.0	42.80	487.00	0.08124
RUN UP-LEAN		4	-0.0	41.00	481.00	0.07449
RUN UP-RICH		5	-0.0	41.60	488.00	0.07239
TAKE-OFF		6	-0.0	116.00	1364.00	0.08006
CLIMB		7	-0.0	87.90	1078.00	0.07672
DESCENT		8	-0.0	75.00	883.00	0.07859
APPROACH		9	-0.0	63.30	710.00	0.08197
TAXI		10	-0.0	29.30	280.00	0.07085

3945

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	404.00	-0.00	2.40	4.20	23956.00	0.0	-0.00	-0.00	37.00	-0.00	-0.00
2	841.00	-0.00	5.40	7.70	10647.00	4.00	-0.00	-0.00	33.00	-0.00	-0.00
3	1188.00	-0.00	8.70	8.40	4658.00	62.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1199.00	-0.00	7.60	8.20	2995.00	42.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1199.00	-0.00	7.30	8.00	3327.00	45.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1435.00	-0.00	7.80	9.10	4714.00	115.00	-0.00	-0.00	11.00	-0.00	-0.00
7	1457.00	-0.00	6.80	9.60	2884.00	87.00	-0.00	-0.00	21.00	-0.00	-0.00
8	1390.00	-0.00	7.90	8.80	3272.00	72.00	-0.00	-0.00	8.00	-0.00	-0.00
9	1300.00	-0.00	9.30	8.00	3882.00	49.00	-0.00	-0.00	38.00	-0.00	-0.00
10	729.00	-0.00	6.60	5.90	26618.00	17.00	-0.00	-0.00			

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	538.99	300.13	0.0	1482.04	0.0	0.0	12935.82	7395.07	0.0	35560.91	0.0	0.0
2	770.17	86.97	0.0	1725.53	0.09	0.09	22566.05	2548.21	0.0	50558.11	2.75	2.75
3	1000.58	30.68	0.0	1517.93	1.17	1.17	42824.93	1313.17	0.0	64967.31	50.13	50.13
4	953.68	21.52	0.0	1616.74	0.87	0.87	39100.89	882.50	0.0	66286.50	35.49	35.49
5	943.39	24.62	0.0	1624.41	0.96	0.96	39244.96	1024.37	0.0	67575.50	39.74	39.74
6	907.11	31.40	0.0	1662.83	2.20	2.20	105225.19	3642.17	0.0	192887.75	254.83	254.83
7	823.18	20.00	0.0	1825.98	1.73	1.73	72357.69	1757.58	0.0	160503.81	152.06	152.06
8	937.32	22.23	0.0	1640.51	1.40	1.40	70298.63	1667.55	0.0	123038.38	105.24	105.24
9	1062.19	25.39	0.0	1435.64	0.92	0.92	67236.38	1607.39	0.0	90876.06	58.19	58.19
10	879.42	203.13	0.0	1235.21	0.37	0.37	25766.91	5951.68	0.0	36191.68	10.90	10.90

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	29.30	5.86	770.17	22566.05	4.513	86.97	2548.21	0.510	0.09	2.75	0.0005
6	0.30	116.00	0.58	937.11	105225.19	0.526	31.40	3642.17	0.018	2.20	254.83	0.0013
7	5.00	87.90	7.30	823.18	72357.69	6.006	20.00	1757.58	0.146	1.73	152.06	0.0126
9	6.00	63.30	6.33	1062.19	67236.38	6.724	25.39	1607.39	0.161	0.92	58.19	0.0058
10	4.00	29.30	1.96	879.42	25766.91	1.726	203.13	5951.68	0.399	0.37	10.90	0.0007
TOTAL FOR CYCLE			22.029			19.495			1.233			0.0210
TOTAL FOR CYCLE/LB FUEL						0.885			0.056			0.0010

DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 195 ENGINE TYPE AND MODEL: IO-470-V SERIAL NUMBER: 170012-7-V-RC

RATED HORSEPOWER: 260.

ENGINE TOTAL TIME: 971. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 96.00 FINISH 96.00

ATMOSPHERIC PRESSURE: START 30.14 FINISH 30.14

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 31.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	24.00	265.00	0.08153
IDLE/TAXI		2	-0.0	29.30	313.00	0.07450
RUN UP		3	-0.0	42.20	448.00	0.08272
RUN UP-LEAN		4	-0.0	41.60	453.00	0.08108
RUN UP-RICH		5	-0.0	41.60	460.00	0.07984
TAKE-OFF		6	-0.0	113.10	1280.00	0.08188
CLIMB		7	-0.0	83.80	990.00	0.07651
DESCENT		8	-0.0	74.40	858.00	0.07842
APPROACH		9	-0.0	58.60	668.00	0.07485
TAXI		10	-0.0	29.30	311.00	0.08611

9947

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO2 (DRY) PPMV	NOX (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	740.00	-0.00	7.80	7.80	19880.00	30.00	-0.00	-0.00	54.00	-0.00	-0.00
2	919.00	-0.00	6.80	7.50	17551.00	44.00	-0.00	-0.00	48.00	-0.00	-0.00
3	1132.00	-0.00	10.00	7.10	6738.00	38.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1256.00	-0.00	9.30	7.50	6571.00	38.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1222.00	-0.00	8.90	7.70	6072.00	33.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	-0.00	-0.00	8.30	8.60	8235.00	76.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	-0.00	-0.00	7.10	8.90	5906.00	53.00	-0.00	-0.00	10.00	-0.00	-0.00
8	-0.00	-0.00	7.90	8.50	5684.00	44.00	-0.00	-0.00	6.00	-0.00	-0.00
9	-0.00	-0.00	8.20	7.60	3300.00	62.00	-0.00	-0.00	-0.00	-0.00	-0.00
10	-0.00	-0.00	6.10	6.50	15888.00	44.00	-0.00	-0.00	33.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	895.94	130.78	0.0	1407.73	0.57	0.57	21502.59	3138.76	0.0	33785.40	13.58	13.58
2	855.65	126.48	0.0	1482.82	0.91	0.91	25070.63	3705.98	0.0	43446.59	26.65	26.65
3	1136.64	43.86	0.0	1268.00	0.71	0.71	47966.05	18[illegible]1.01	0.0	53509.43	29.94	29.94
4	1076.25	43.55	0.0	1363.73	0.72	0.72	44771.94	1811.75	0.0	56731.26	30.04	30.09
5	1044.92	40.83	0.0	142[illegible].43	0.64	0.64	43468.52	1698.48	0.0	59089.98	26.47	26.47
6	946.09	53.76	0.0	1540.24	1.42	1.42	107002.19	6080.28	0.0	174201.19	160.93	160.93
7	864.57	41.19	0.0	1702.82	1.06	1.06	72450.56	3451.61	0.0	142695.94	88.83	88.83
8	940.56	38.76	0.0	1590.08	0.86	0.86	69977.81	2883.58	0.0	118301.63	64.02	64.02
9	1027.03	23.67	0.0	1495.61	1.28	1.28	60183.70	1367.15	0.0	87642.88	74.74	74.74
10	868.53	129.56	0.0	1454.15	1.03	1.03	25447.98	3796.10	0.0	42606.43	30.15	30.15

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	29.30	5.86	855.65	25070.62	5.014	126.48	3705.98	0.741	0.91	26.65	0.0053
6	0.30	113.10	0.57	946.09	107002.19	0.535	53.76	6080.28	0.030	1.42	160.93	0.0008
7	5.00	83.80	6.96	864.57	72450.56	6.013	41.19	3451.61	0.286	1.06	88.83	0.0074
9	6.00	58.60	5.86	1027.03	60183.70	6.018	23.67	1387.15	0.139	1.28	74.74	0.0075
10	4.00	29.30	1.96	868.53	25447.98	1.705	129.56	3796.10	0.254	1.03	30.15	0.0020
TOTAL FOR CYCLE			21.204			19.286			1.451			0.0230
TOTAL FOR CYCLE/LB FUEL						0.910			0.068			0.0011

DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 378   ENGINE TYPE AND MODEL: IO-470-VO   SERIAL NUMBER: 149063VO

RATED HORSEPOWER: / 260.

ENGINE TOTAL TIME: 185. HRS

FUEL: AV GAS 100/130   FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 89.50 FINISH 90.00

ATMOSPHERIC PRESSURE: START 30.06 FINISH 30.06

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 46.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	19.30	232.00	0.05871
IDLE/TAXI		2	-0.0	26.40	359.00	0.06269
RUN UP		3	-0.0	47.50	601.00	0.07381
RUN UP-LEAN		4	-0.0	24.60	331.00	0.06803
RUN UP-RICH		5	-0.0	51.00	689.00	0.06716
TAKE-OFF		6	-0.0	96.70	1248.00	0.07558
CLIMB		7	-0.0	77.40	988.00	0.07500
DESCENT		8	-0.0	70.30	880.00	0.07663
APPROACH		9	-0.0	59.80	713.00	0.07895
TAXI		10	-0.0	24.60	321.00	0.07027

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	673.00	-0.00	3.50	8.00	11981.00	15.00	-0.00	-0.00	21.00	-0.00	-0.00
2	874.00	-0.00	3.00	10.50	2105.00	37.00	-0.00	-0.00	12.00	-0.00	-0.00
3	1199.00	-0.00	5.70	10.20	2051.00	167.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1256.00	-0.00	3.80	11.00	1079.00	120.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1233.00	-0.00	3.60	11.00	1187.00	108.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	-0.00	-0.00	5.30	10.90	3454.00	688.00	-0.[illegible]	-0.00	8.00	-0.00	-0.00
7	-0.00	-0.00	5.60	10.60	1943.00	589.00	-0.00	-0.00	8.00	-0.00	-0.00
8	1356.00	-0.00	6.30	10.20	2159.00	454.00	-0.00	-0.00	8.00	-0.00	-0.00
9	1278.00	-0.00	7.70	9.20	2375.00	216.00	-0.00	-0.00	6.00	-0.00	-0.00
10	886.00	-0.00	4.60	10.50	2591.00	55.00	-0.00	-0.00			

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	556.84	109.17	0.0	1999.82	0.39	0.39	10747.02	2106.97	0.0	38596.54	7.57	7.57
2	442.05	17.76	0.0	2430.95	0.90	0.90	11670.07	468.97	0.0	64177.09	23.64	23.64
3	715.01	14.73	0.0	2010.37	3.44	3.44	33963.04	699.91	0.0	95492.75	163.44	163.44
4	514.95	8.37	0.0	2342.16	2.67	2.67	12667.88	206.01	0.0	57617.08	65.71	65.71
5	494.12	9.33	0.0	2372.27	2.43	2.43	25200.25	475.88	0.0	120985.56	124.18	124.18
6	647.14	24.15	0.0	2091.17	13.80	13.80	62578.69	2335.71	0.0	202216.00	1334.32	1334.32
7	690.08	13.71	0.0	2052.36	11.92	11.92	53411.85	1061.37	0.0	158852.38	922.75	922.75
8	761.40	14.94	0.0	1936.92	9.01	9.01	53526.38	1050.57	0.0	136165.06	633.58	633.58
9	907.71	16.03	0.0	1704.04	4.18	4.18	54280.79	958.88	0.0	101901.69	250.11	250.11
10	605.05	19.52	0.0	2170.02	1.19	1.19	14884.31	480.16	0.0	53382.45	29.23	29.23

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	26.40	5.28	442.05	11670.07	2.334	17.76	468.97	0.094	0.90	23.64	0.0047
6	0.30	96.70	0.48	647.14	62578.69	0.313	24.15	2335.71	0.012	13.80	1334.32	0.0067
7	5.00	77.40	6.42	690.08	53411.85	4.433	13.71	1061.37	0.088	11.92	922.75	0.0766
9	6.00	59.80	5.98	907.71	54280.79	5.428	16.03	958.88	0.096	4.18	250.11	0.0250
10	4.00	24.60	1.65	605.05	14884.31	0.997	19.52	480.16	0.032	1.19	29.23	0.0020
TOTAL FOR CYCLE			19.816			13.505			0.322			0.1150
TOTAL FOR CYCLE/LB FUEL						0.682			0.016			0.0058

DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 379 ENGINE TYPE AND MODEL: IO-470-VO SERIAL NUMBER: 149063VOA

RATED HORSEPOWER: 260.

ENGINE TOTAL TIME: 185. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 89.00 FINISH 90.50

ATMOSPHERIC PRESSURE: START 30.06 FINISH 30.06

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 45.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	21.10	222.00	0.06958
IDLE/TAXI		2	-0.0	26.40	343.00	0.07121
RUN UP		3	-0.0	49.20	617.00	0.07754
RUN UP-LEAN		4	-0.0	26.40	341.00	0.07571
RUN UP-RICH		5	-0.0	49.20	643.00	0.07556
TAKE-OFF		6	-0.0	123.10	1571.00	0.07754
CLIMB		7	-0.0	94.90	1200.00	0.07651
DESCENT		8	-0.0	77.40	931.00	0.07966
APPROACH		9	-0.0	63.30	742.00	0.08141
TAXI		10	-0.0	24.60	247.00	0.08027

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TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	605.00	-0.00	4.90	7.60	25132.00	15.00	-0.00	-0.00	25.00	-0.00	-0.00
2	863.00	-0.00	4.50	10.60	4726.00	52.00	-0.00	-0.00	18.00	-0.00	-0.00
3	975.00	-0.00	6.30	10.40	2309.00	259.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1043.00	-0.00	5.30	11.10	1879.00	157.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	975.00	-0.00	5.10	11.30	1718.00	162.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1256.00	-0.00	5.60	10.90	4726.00	679.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1233.00	-0.00	6.00	10.50	2148.00	314.00	-0.00	-0.00	8.00	-0.00	-0.00
8	1177.00	-0.00	7.60	9.50	2148.00	226.00	-0.00	-0.00	13.00	-0.00	-0.00
9	1076.00	-0.00	8.40	9.00	2524.00	231.00	-0.00	-0.00	6.00	-0.00	-0.00
10	314.00	-0.00	7.00	7.60	27065.00	42.00	-0.00	-0.00	27.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	659.36	193.69	0.0	1606.87	0.33	0.33	13912.55	4086.80	0.0	33904.91	7.00	7.00
2	583.79	35.11	0.0	2160.65	1.11	1.11	15411.92	927.01	0.0	57041.21	29.25	29.25
3	751.73	15.78	0.0	1949.82	5.08	5.08	36985.15	776.35	0.0	95930.88	249.75	249.75
4	645.49	13.11	0.0	2124.08	3.14	3.14	17040.80	346.01	0.0	56075.80	82.92	82.92
5	621.73	12.00	0.0	2164.46	3.24	3.24	30589.14	590.15	0.0	106491.25	159.60	159.60
6	666.56	32.22	0.0	2038.54	13.28	13.28	82053.94	3965.97	0.0	250943.75	1634.19	1634.19
7	725.19	14.87	0.0	1994.01	6.23	6.23	68820.50	1411.06	0.0	189231.88	591.58	591.58
8	886.74	14.35	0.0	1741.59	4.33	4.33	68633.88	1110.98	0.0	134799.06	335.24	335.24
9	961.34	16.54	0.0	1618.37	4.34	4.34	60852.84	1047.22	0.0	102442.94	274.87	274.87
10	817.13	180.94	0.0	1393.94	0.81	0.81	20101.36	4451.24	0.0	34290.91	19.81	19.81

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	26.40	5.28	583.79	15411.92	3.082	35.11	927.01	0.185	1.11	29.25	0.0059
6	0.30	123.10	0.62	666.56	82053.94	0.410	32.22	3965.97	0.020	13.28	1634.19	0.0082
7	5.00	94.90	7.88	725.19	68820.50	5.712	14.87	1411.06	0.117	6.23	591.58	0.0491
9	6.00	63.30	6.33	961.34	60852.84	6.085	16.54	1047.22	0.105	4.34	274.87	0.0275
10	4.00	24.60	1.65	817.13	20101.36	1.347	180.94	4451.24	0.298	0.81	19.81	0.0013
TOTAL FOR CYCLE			21.750			16.637			0.725			0.0919
TOTAL FOR CYCLE/LB FUEL						0.765			0.033			0.0042

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DATE:   8/17/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL
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ENGINE DATA ***************************************************************************
                                                                  SERIAL NUMBER:   149063VOB
     CAL ID NUMBER:  380    ENGINE TYPE AND MODEL:  IO-470-VO

                            RATED HORSEPOWER:   260.

     ENGINE TOTAL TIME:    185. HRS

     FUEL: AV GAS 100/130          FUEL H/C RATIO:    1.840
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OPERATIONAL DATA ***********************************************************************
     INLET AIR TEMPERATURE, DEGREES F:  START   81.50   FINISH   83.00

     ATMOSPHERIC PRESSURE:              START   30.04   FINISH   30.04

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     61.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, CEGHEES C:   -0.0C,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  10

COMMENTS:
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	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	21.10	218.00	0.07786
IDLE/TAXI		2	-0.0	24.60	328.00	0.07164
RUN UP		3	-0.0	49.20	615.00	0.07383
RUN UP-LEAN		4	-0.0	29.90	386.00	0.07210
RUN UP-RICH		5	-0.0	49.20	643.00	0.07041
TAKE-OFF		6	-0.0	107.20	1354.00	0.07402
CLIMB		7	-0.0	80.90	1038.00	0.07367
DESCENT		8	-0.0	68.60	639.00	0.07595
APPROACH		9	-0.0	59.80	704.00	0.07878
TAXI		10	-0.0	24.60	245.00	0.08299

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	-0.00	-0.00	6.40	7.90	25132.00	25.00	-0.00	-0.00	31.00	-0.00	-0.00
2	-0.00	-0.00	3.80	11.40	5263.00	177.00	-0.00	-0.00	15.00	-0.00	-0.00
3	-0.00	-0.00	6.00	9.80	2792.00	226.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	-0.00	-0.00	5.00	10.50	2578.00	168.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	-0.00	-0.00	4.70	10.70	22.50	158.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	-0.00	-0.00	5.70	10.10	3437.00	148.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	-0.00	-0.00	5.40	10.50	1987.00	309.00	-0.00	-0.00	3.00	-0.00	-0.00
8	-0.00	-0.00	6.80	9.50	2148.00	202.00	-0.00	-0.00	6.00	-0.00	-0.00
9	-0.00	-0.00	8.00	8.80	2695.00	202.00	-0.00	-0.00	2.00	-0.00	-0.00
10	-0.00	-0.00	7.80	7.50	25776.00	27.00	-0.00	-0.00	24.00	-0.60	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	769.01	172.95	0.0	1491.48	0.49	0.49	16226.07	3649.27	0.0	31470.14	10.41	10.41
2	488.16	38.72	0.0	2301.01	3.73	3.73	12008.63	952.55	0.0	56604.81	91.88	91.88
3	753.86	20.09	0.0	1934.65	4.66	4.66	37089.73	988.47	0.0	95184.63	229.47	229.47
4	641.03	18.93	0.0	2115.11	3.54	3.54	19166.70	565.99	0.0	63241.88	105.78	105.78
5	616.47	0.17	0.0	2205.15	3.40	3.40	30330.55	8.32	0.0	108493.75	167.48	167.48
6	713.30	24.63	0.0	1985.91	3.04	3.04	76465.94	2640.69	0.0	212888.94	326.12	326.12
7	677.65	14.28	0.0	2070.23	6.37	6.37	54821.76	1155.32	0.0	167489.19	515.27	515.27
8	331.84	15.05	0.0	1825.96	4.06	4.06	57063.87	1032.36	0.0	125260.50	278.43	278.43
9	946.88	19.20	0.0	1636.54	3.93	3.93	56623.63	1088.42	0.0	97865.19	234.84	234.84
10	981.43	166.82	0.0	1331.66	0.50	0.50	21683.12	4103.82	0.0	32758.71	12.33	12.33

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSI LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	24.60	4.92	488.16	12008.63	2.402	38.72	952.55	0.191	3.73	91.88	0.0184
6	0.30	107.20	0.54	713.30	76465.94	0.382	24.63	2640.69	0.013	3.04	326.12	0.0016
7	5.00	80.90	6.71	677.65	54821.76	4.550	14.28	1155.32	0.096	6.37	515.27	0.0428
9	6.00	59.80	5.98	946.88	56623.63	5.662	18.20	1088.42	0.109	3.93	234.84	0.0235
10	4.00	24.60	1.65	881.43	21683.12	1.453	166.82	4103.82	0.275	0.50	12.33	0.0008
TOTAL FOR CYCLE			19.799			14.449			0.683			0.0871
TOTAL FOR CYCLE/LB FUEL						0.730			0.035			0.0044

DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 381 ENGINE TYPE AND MODEL: IO-470-VO SERIAL NUMBER: 49055VO

RATED HORSEPOWER: 260.

ENGINE TOTAL TIME: 185. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 86.00 FINISH 86.00

ATMOSPHERIC PRESSURE: START 30.04 FINISH 30.04

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 57.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	10.50	102.00	0.07101
IDLE/TAXI		2	-0.0	17.60	199.00	0.08006
RUN UP		3	-0.0	31.60	401.00	0.07535
RUN UP-LEAN		4	-0.0	29.90	396.00	0.07403
RUN UP-RICH		5	-0.0	31.60	420.00	0.07382
TAKE-OFF		6	-0.0	110.80	1405.00	0.07745
CLIMB		7	-0.0	80.90	1023.00	0.07430
DESCENT		8	-0.0	70.30	850.00	0.08143
APPROACH		9	-0.0	51.00	598.00	0.08219
TAXI		10	-0.0	14.10	136.00	0.08903

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO_2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO_2 (DRY) PPMV	NO_X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	482.00	-0.00	4.80	7.00	34824.00	78.00	-0.00	-0.00	60.00	-0.00	-0.00
2	762.00	-0.00	7.40	8.90	10577.00	53.00	-0.00	-0.00	29.00	-0.00	-0.00
3	1199.00	-0.00	5.80	10.40	2549.00	249.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1256.00	-0.00	4.60	11.50	1519.00	176.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1222.00	-0.00	4.50	11.50	2061.00	197.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1446.00	-0.00	5.70	10.70	5370.00	539.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1480.00	-0.00	5.80	10.20	2115.00	373.00	-0.00	-0.00	6.00	-0.00	-0.00
8	-0.00	-0.00	7.70	9.80	2224.00	192.00	-0.00	-0.00	4.00	-0.00	-0.00
9	-0.00	-0.00	8.50	9.10	2278.00	171.00	-0.00	-0.00	10.00	-0.00	-0.00
10	-0.00	-0.00	8.90	7.40	28640.00	21.00	-0.00	-0.00	44.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	634.53	263.65	0.0	1453.94	1.69	1.69	6662.55	2768.37	0.0	15266.37	17.78	17.78
2	861.27	70.50	0.0	1627.56	1.01	1.01	15158.42	1240.88	0.0	28645.09	17.83	17.83
3	712.09	17.92	0.0	2006.22	5.02	5.02	22502.01	566.38	0.0	63396.50	158.68	158.68
4	571.81	10.81	0.0	2246.12	3.59	3.59	17097.24	323.35	0.0	67159.06	107.45	107.45
5	560.97	14.71	0.0	2252.47	4.03	4.03	17726.48	464.98	0.0	71178.06	127.47	127.47
6	679.89	36.68	0.0	2005.34	10.56	10.56	75332.00	4064.66	0.0	222191.31	1170.08	1170.08
7	722.78	15.10	0.0	1997.18	7.63	7.63	58472.95	1221.19	0.0	161571.75	617.67	617.67
8	877.75	14.52	0.0	1755.27	3.60	3.60	61705.70	1020.74	0.0	123395.38	252.73	252.73
9	963.21	14.78	0.0	1620.26	3.18	3.18	49123.95	754.00	0.0	82633.00	162.33	162.33
10	938.22	172.92	0.0	1225.71	0.36	0.36	13228.94	2438.11	0.0	17282.44	5.13	5.13

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	17.60	3.52	861.27	15158.42	3.032	70.50	1240.88	0.248	1.01	17.83	0.0036
6	0.30	110.80	0.55	679.89	75332.00	0.377	36.68	4064.66	0.020	10.56	1170.08	0.0059
7	5.00	80.90	6.71	722.78	58472.95	4.853	15.10	1221.19	0.101	7.63	617.67	0.0513
9	6.00	51.00	5.10	963.21	49123.95	4.912	14.78	754.00	0.075	3.18	162.33	0.0162
10	4.00	14.10	0.94	938.22	13228.94	0.886	172.92	2438.11	0.163	0.36	5.13	0.0003
TOTAL FOR CYCLE			16.833			14.060			0.609			0.0773
TOTAL FOR CYCLE/LB FUEL						0.835			0.036			0.0046

DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 382   ENGINE TYPE AND MODEL: IO-470-VO   SERIAL NUMBER: 49055VOA

RATED HORSEPOWER: 260.

ENGINE TOTAL TIME: 185. HRS

FUEL: AV GAS 100/130   FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGRFES F: START 90.00 FINISH 90.00

ATMOSPHERIC PRESSURE: START 30.05 FINISH 30.04

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 55.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	10.50	96.00	0.06977
IDLE/TAXI		2	-0.0	15.80	175.00	0.08185
RUN UP		3	-0.0	33.40	384.00	0.08142
RUN UP-LEAN		4	-0.0	26.40	323.00	0.06490
RUN UP-RICH		5	-0.0	31.60	383.00	0.07837
TAKE-OFF		6	-0.0	98.40	124.10	0.07846
CLIMB		7	-0.0	77.40	967.00	0.07757
DESCENT		8	-0.0	63.30	756.00	0.07980
APPROACH		9	-0.0	51.00	592.00	0.08055
TAXI		10	-0.0	15.80	146.00	0.08701

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TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	482.00	-0.00	3.50	6.90	46144.00	185.00	-0.00	-0.00	40.00	-0.00	-0.00
2	762.00	-0.00	7.60	8.80	13358.00	36.00	-0.00	-0.00	29.00	-0.00	-0.00
3	1099.00	-0.00	8.70	8.50	4129.00	68.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1121.00	-0.00	6.90	6.70	3373.00	73.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1143.00	-0.00	7.20	9.50	3373.00	68.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1412.00	-0.00	6.00	10.60	5478.00	473.00	-0.00	-0.00	8.00	-0.00	-0.00
7	1435.00	-0.00	6.40	10.30	2294.00	263.00	-0.00	-0.00	5.00	-0.00	-0.00
8	1334.00	-0.00	7.80	9.30	2294.00	200.00	-0.00	-0.00	3.00	-0.00	-0.00
9	1256.00	-0.00	8.50	8.70	2402.00	146.00	-0.00	-0.00	45.00	-0.00	-0.00
10	471.00	-0.00	8.40	6.80	34811.00	19.00	-0.00	-0.00			

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	470.94	355.59	0.0	1458.75	4.09	4.09	4944.82	3733.74	0.0	15316.88	42.93	42.93
2	865.69	87.14	0.0	1574.97	0.67	0.67	13677.97	1376.88	0.0	24884.49	10.64	10.64
3	997.91	27.12	0.0	1531.89	1.28	1.28	33330.09	905.96	0.0	51165.14	42.79	42.79
4	1000.17	28.00	0.0	1525.94	1.74	1.74	26404.37	739.25	0.0	40284.68	45.88	45.88
5	853.76	22.91	0.0	1769.96	1.32	1.32	26978.65	723.85	0.0	55930.65	41.85	41.85
6	706.88	36.96	0.0	1962.17	9.15	9.15	69556.75	3637.10	0.0	193077.75	900.68	900.68
7	743.73	15.68	0.0	1931.24	5.16	5.16	59112.73	1213.50	0.0	149477.69	399.00	399.00
8	909.31	15.32	0.0	1703.49	3.83	3.83	57559.41	969.53	0.0	107830.81	242.42	242.42
9	984.62	15.94	0.0	1583.46	2.78	2.78	50215.70	812.72	0.0	80756.56	141.68	141.68
10	908.40	215.61	0.0	1155.44	0.34	0.34	14352.78	3406.58	0.0	18255.92	5.33	5.33

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	15.80	3.16	865.69	13677.97	2.736	87.14	1376.88	0.275	0.67	10.64	0.0021
6	0.30	98.40	0.49	706.88	69556.75	0.348	36.96	3637.10	0.018	9.15	900.68	0.0045
7	5.00	77.40	6.42	763.73	59112.73	4.906	15.68	1213.50	0.101	5.16	399.00	0.0331
9	6.00	51.00	5.10	984.62	50215.70	5.022	15.94	812.72	0.081	2.78	141.68	0.0142
10	4.00	15.80	1.06	908.40	14352.78	0.962	215.61	3406.58	0.228	0.34	5.33	0.0004
TOTAL FOR CYCLE			16.235			13.973			0.704			0.0543
TOTAL FOR CYCLE/LB FUEL						0.861			0.043			0.0033

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DATE:   8/17/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ******************************************************************************************

     CAL ID NUMBER:  383    ENGINE TYPE AND MODEL:  IO-470-VO                SERIAL NUMBER:   49055VO8

                            RATED HORSEPOWER:   260.

     ENGINE TOTAL TIME:    185. HRS

     FUEL: AV GAS 100/130              FUEL H/C RATIO:    1.840

OPERATIONAL DATA *************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   77.50   FINISH   78.00

     ATMOSPHERIC PRESSURE:              START   30.04   FINISH   30.04

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.04

     RELATIVE HUMIDITY:                     168.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  10

COMMENTS:



                  CARB.    TEST      ENGINE        MEASURED        MEASURED        CALCULATED
                  HEATER   MODE       RPM          FUEL FLOW       AIR FLOW           F/A
                                                    LB/HR           LB/HR

IDLE-LOW                     1        -0.0           12.30          141.00         0.04616
IDLE/TAXI                    2        -0.0           15.80          213.00         0.06840
RUN UP                       3        -0.0           33.40          397.00         0.C7928
RUN UP-LEAN                  4        -0.0           26.40          330.00         0.07603
RUN UP-RICH                  5        -0.0           28.10          329.00         0.07679
TAKE-OFF                     6        -0.0          102.00         1282.00         0.07902
CLIMB                        7        -0.0           72.10          888.00         0.07823
DESCENT                      8        -0.0           63.30          749.00         0.07996
APPROACH                     9        -0.0           49.20          579.00         0.08051
TAXI                        10        -0.0           15.80          198.00         0.07049


  TEST   EXHAUST     EXHAUST      CO          CO          THC        NO         NO         NO      ALDEHYDES  · SMOKE      PARTICULATES
  MODE     GAS         GAS       (DRY)         2         (DRY)     (DRY)        2          X        (DRY)
          TEMP      PRESSURE   PERCENT V    (DRY)        PPMV       PPMV      (DRY)      (DRY)
        DEGREES F     PSIA               PERCENT V                            PPMV       PPMV

   1      -0.00       -0.00       1.30        6.70   19332.00     27.00      -0.00      -0.00      32.00      -0.00         -0.00
   2      -0.00       -0.00       3.50       11.10    3974.00     63.00      -0.00      -0.00      15.00      -0.00         -0.00
   3      -0.00       -0.00       7.80        9.10    3007.00    114.00      -0.00      -0.00      -0.00      -0.00         -0.00
   4      -0.00       -0.00       6.20       10.10    2792.00     96.00      -0.00      -0.00      -0.00      -0.00         -0.00
   5      -0.00       -0.00       6.50       10.00    2363.00     90.00      -0.00      -0.00      -0.00      -0.00         -0.00
   6    1569.00       -0.00       6.10       10.60    5692.00    497.00      -0.00      -0.00      -0.00      -0.00         -0.00
   7    1424.00       -0.00       6.80       10.00    2470.00    215.00      -0.00      -0.00      13.00      -0.00         -0.00
   8    1368.00       -0.00       8.00        9.10    2470.00    167.00      -0.00      -0.00      21.00      -0.00         -0.00
   9    1300.00       -0.00       8.20        9.00    2578.00    160.00      -0.00      -0.00      19.00      -0.00         -0.00
  10     762.00       -0.00       3.80       10.50   11116.00     50.00      -0.00      -0.00      15.00      -0.00         -0.00


  TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1      264.40     225.18       0.0     2141.04       0.90       0.90    3252.08    2769.74       0.0    26334.82     11.09      11.09
   2      471.47      30.66       0.0     2349.35       1.39       1.39    7449.22     484.41       0.0    37119.69     22.02      22.02
   3      916.12      20.23       0.0     1679.33       2.20       2.20   30598.25     675.59       0.0    56089.52     73.46      73.46
   4      755.49      19.48       0.0     1933.74       1.92       1.92   19944.98     514.40       0.0    51050.69     50.73      50.73
   5      784.61      16.34       0.0     1896.62       1.78       1.78   22047.62     459.05       0.0    53295.03     50.14      50.14
   6      713.61      38.14       0.0     1948.38       9.55       9.55   72787.94    3889.91       0.0   198734.75    974.11     974.11
   7      805.87      16.76       0.0     1862.05       4.19       4.19   58102.92    1208.73       0.0   134254.00    301.75     301.75
   8      931.68      16.47       0.0     1665.16       3.19       3.19   58975.40    1042.85       0.0   105404.75    202.22     202.22
   9      948.91      17.09       0.0     1636.41       3.04       3.04   46686.49     840.63       0.0    80511.50    149.63     149.63
  10      498.12      83.45       0.0     2162.63       1.08       1.08    7870.36    1318.57       0.0    34169.49     17.01      17.01


                                                    LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED     FUEL        CO          CO          CO         HC          HC          HC         NO         NO          NO
  MODE     MODE     FUEL FLOW    USED       LB/1K       LB/1K     EMISSION     LB/1K       LB/1K     EMISSION     LB/1K      LB/1K     EMISSION
           MIN.      LB/HR       LBS.      LB FUEL      HOURS       LBS.      LB FUEL      HOURS       LBS.      LB FUEL     HOURS       LBS.

   2      12.00      15.80       3.16      471.47     7449.22      1.490       30.66      484.41      0.097       1.39       22.02     0.0044
   6       0.30     102.00       0.51      713.61    72787.94      0.364       38.14     3889.91      0.019       9.55      974.11     0.0049
   7       5.00      72.10       5.98      805.87    58102.92      4.823       16.76     1208.73      0.100       4.19      301.75     0.0250
   9       6.00      49.20       4.92      948.91    46686.49      4.669       17.09      840.63      0.084       3.04      149.63     0.0150
  10       4.00      15.80       1.06      498.12     7870.36      0.527       83.45     1318.57      0.088       1.08       17.01     0.0011

TOTAL FOR CYCLE                 15.633                            11.872                             0.389                             0.0504

TOTAL FOR CYCLE/LB FUEL                                            0.759                             0.025                             0.0032
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DATE: 7/16/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 163 ENGINE TYPE AND MODEL: O-470-R SERIAL NUMBER: 203247-70RA

RATED HORSEPOWER: 230.

ENGINE TOTAL TIME: 181. HRS

FUEL: AV GAS 80/87 FUEL H/C RATIO: 1.840

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 89.50 FINISH 89.00

ATMOSPHERIC PRESSURE: START 29.09 FINISH 29.09

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 41.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	10.60	115.00	0.07780
IDLE/TAXI		2	-0.0	15.00	181.00	0.07260
RUN UP		3	-0.0	35.50	470.00	0.07132
RUN UP-LEAN		4	-0.0	35.50	463.00	0.07135
RUN UP-RICH		5	-0.0	35.50	467.00	0.07131
TAKE-OFF		6	-0.0	108.80	1253.00	0.08003
CLIMB		7	-0.0	101.00	1330.00	0.07176
DESCENT		8	-0.0	57.40	751.00	0.07180
DESCENT	ON	8	-0.0	49.60	508.00	0.08559
APPROACH		9	-0.0	44.80	571.00	0.07346
TAXI		10	-0.0	12.40	153.00	0.07402

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	-0.00	-0.00	9.30	7.40	10493.00	16.00	-0.00	-0.00	29.00	-0.00	-0.00
2	-0.00	-0.00	6.80	8.70	2294.00	48.00	-0.00	-0.00	12.00	-0.00	-0.00
3	-0.00	-0.00	4.70	10.80	1089.00	169.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	-0.00	-0.00	5.10	10.40	860.00	99.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	-0.00	-0.00	4.90	10.60	917.00	82.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	-0.00	-0.00	8.80	8.30	1950.00	180.00	-0.00	-0.00	5.00	-0.00	-0.00
7	-0.00	-0.00	4.90	10.70	975.00	199.00	-0.00	-0.00	3.00	-0.00	-0.00
8	-0.00	-0.00	5.00	10.60	975.00	169.00	-0.00	-0.00	1.00	-0.00	-0.00
8	-0.00	-0.00	11.60	6.40	3211.00	21.00	-0.00	-0.00	2.00	-0.00	-0.00
9	-0.00	-0.00	5.90	10.00	1147.00	124.00	-0.00	-0.00	2.00	-0.00	-0.00
10	-0.00	-0.00	6.50	9.40	1892.00	32.00	-0.00	-0.00			

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	1001.11	72.49	0.0	1402.41	0.32	0.32	10611.80	768.34	0.0	14865.55	3.36	3.36
2	873.37	16.87	0.0	1755.69	1.01	1.01	13100.56	253.12	0.0	26335.29	15.19	15.19
3	608.31	8.07	0.0	2196.30	3.59	3.59	21595.12	286.57	0.0	77968.63	127.55	127.55
4	661.05	6.38	0.0	2118.06	2.11	2.11	23467.44	226.64	0.0	75191.19	74.83	74.83
5	634.90	6.80	0.0	2158.01	1.75	1.75	22530.88	241.57	0.0	76609.13	61.95	61.95
6	1027.93	13.05	0.0	1523.34	3.45	3.45	111838.81	1419.35	0.0	165739.56	375.75	375.75
7	630.62	7.19	0.0	2163.68	4.21	4.21	63692.52	725.84	0.0	218531.81	424.88	424.88
8	643.49	7.19	0.0	2143.46	3.57	3.57	36936.26	412.51	0.0	123034.56	205.06	205.06
8	1279.11	20.28	0.0	1108.84	0.38	0.38	63443.88	1005.81	0.0	54998.41	18.87	18.87
9	744.28	8.29	0.0	1982.08	2.57	2.57	33343.63	371.25	0.0	88797.19	115.11	115.11
10	816.17	13.61	0.0	1854.53	0.66	0.66	10120.51	168.72	0.0	22996.14	8.18	8.18

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	15.00	3.00	873.37	13100.56	2.620	16.87	253.12	0.051	1.01	15.19	0.0030
6	0.30	108.80	0.54	1027.93	111838.81	0.559	13.05	1419.35	0.007	3.45	375.75	0.0019
7	5.00	101.00	8.38	630.62	63692.52	5.286	7.19	725.84	0.060	4.21	424.88	0.0353
9	6.00	44.80	4.48	744.28	33343.63	3.334	8.29	371.25	0.037	2.57	115.11	0.0115
10	4.00	12.40	0.83	816.17	10120.51	0.678	13.61	168.72	0.011	0.66	8.18	0.0005
TOTAL FOR CYCLE			17.238			12.478			0.166			0.0522
TOTAL FOR CYCLE/LB FUEL						0.724			0.010			0.0030

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DATE:   8/17/71
TEST ORGANIZATION:  SCOTT/GEN AVIATION
ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL
ENGINE DATA ****************************************************************************************************
    CAL ID NUMBER:  390    ENGINE TYPE AND MODEL:  O-470-R                    SERIAL NUMBER:   133510-6-R
                           RATED HORSEPOWER:   230.
    ENGINE TOTAL TIME:     69. HRS
    FUEL: AV GAS 100/130          FUEL H/C RATIO:    1.840
OPERATIONAL DATA ***********************************************************************************************
    INLET AIR TEMPERATURE, DEGREES F:  START   75.00   FINISH   74.50
    ATMOSPHERIC PRESSURE:              START   30.12   FINISH   30.12
    INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01
    RELATIVE HUMIDITY:                     47.00  PERCENT
    SAMPLE LINE:  TEMPERATURE, DEGREES C:  -0.00,  FLOW RATE, LITERS/MIN:    7.00
    SAMPLE LINE TRANSPORT TIME, SEC:    1.60
NUMBER OF TESTS:  11
COMMENTS:


                      CARB.    TEST      ENGINE       MEASURED       MEASURED      CALCULATED
                      HEATER   MODE       RPM         FUEL FLOW      AIR FLOW         F/A
                                                       LB/HR          LB/HR
IDLE-LOW                         1        -0.0         14.10          90.00         0.09221
IDLE/TAXI                        2        -0.0         16.70         168.00         0.08839
RUN UP                           3        -0.0         30.90         388.00         0.07375
RUN UP-LEAN                      4        -0.0         30.00         403.00         0.07101
RUN UP-RICH                      5        -0.0         30.00         397.00         0.07212
YAKE-OFF                         6        -0.0         97.70        1131.00         0.08409
CLIMB                            7        -0.0         71.30         937.00         0.07525
DESCENT                          8        -0.0         62.30         802.00         0.07498
DESCENT                          8        -0.0         66.30         696.00         0.08864
APPROACH                         9        -0.0         42.00         517.00         0.07687
TAXI                            10        -0.0         15.80         156.00         0.09050


 TEST   EXHAUST    EXHAUST      CO          CO          THC        NO        NO         NO      ALDEHYDES    SMOKE    PARTICULATES
 MODE     GAS        GAS       (DRY)         2         (DRY)     (DRY)        2          X       (DRY)
          TEMP    PRESSURE   PERCENT V    (DRY)        PPMV      PPMV      (DRY)      (DRY)
       DEGREES F    PSIA               PERCENT V                           PPMV       PPMV
   1    628.00     -0.00        8.40        3.90    72414.00      3.00     -0.00      -0.00      36.00      -0.00       -0.00
   2    930.00     -0.00       10.30        7.20    14971.00      8.00     -0.00      -0.00      27.00      -0.00       -0.00
   3   1256.00     -0.00        6.00        9.90     1682.00    167.00     -0.00      -0.00      -0.00      -0.00       -0.00
   4   1390.00     -0.00        4.10       11.40      868.00    100.00     -0.00      -0.00      -0.00      -0.00       -0.00
   5   1356.00     -0.00        4.50       11.20     1139.00     95.00     -0.00      -0.00      -0.00      -0.00       -0.00
   6   1536.00     -0.00        9.00        9.00     2278.00     38.00     -0.00      -0.00      -0.00      -0.00       -0.00
   7   1558.00     -0.00        4.90       11.50     1193.00    114.00     -0.00      -0.00       8.00      -0.00       -0.00
   8   1513.00     -0.00        5.50       10.90      124.80     89.00     -0.00      -0.00       8.00      -0.00       -0.00
   8   1323.00     -0.00       11.70        7.10     2332.00     17.00     -0.00      -0.00       6.00      -0.00       -0.00
   9   1323.00     -0.00        6.80        9.80     1356.00    266.00     -0.00      -0.00       7.00      -0.00       -0.00
  10    964.00     -0.00       10.90        7.00    15296.00      6.00     -0.00      -0.00      13.00      -0.00       -0.00


 TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 MODE      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
         LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
        LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL
   1    868.41     428.76       0.0      633.50       0.05       0.05   12244.59    6045.51       0.0     8932.40       0.72       0.72
   2   1095.35      91.18       0.0     1203.05       0.14       0.14   18292.30    1522.74       0.0    20091.00       2.33       2.33
   3    754.37      12.11       0.0     1955.73       3.45       3.45   23310.10     374.25       0.0    60431.95     106.57     106.57
   4    531.41       6.44       0.0     2321.60       2.13       2.13   15942.26     193.30       0.0    69648.06      63.87      63.87
   5    574.88       8.33       0.0     2248.12       1.99       1.99   17246.30     250.01       0.0    67443.50      59.80      59.80
   6    997.49      14.46       0.0     1567.29       0.69       0.69   97455.06    1412.74       0.0   153123.69      67.59      67.59
   7    599.25       8.36       0.0     2209.77       2.29       2.29   42726.32     595.78       0.0   157556.25     163.28     163.28
   8    677.00       0.88       0.0     2108.11       1.80       1.80   42177.25      54.81       0.0   131334.94     112.11     112.11
   8   1241.87      14.18       0.0     1184.10       0.30       0.30   82335.94     939.89       0.0    78505.50      19.65      19.65
   9    820.86       9.37       0.0     1858.77       5.27       5.27   34476.13     393.74       0.0    78068.19     221.52     221.52
  10   1133.35      91.09       0.0     1143.60       0.10       0.10   17906.95    1439.19       0.0    18068.88       1.62       1.62


                                                    LTO CYCLE EMISSIONS

 TEST    TIME IN   MEASURED    FUEL        CO         CO         CO          HC         HC          HC         NO         NO          NO
 MODE     MODE     FUEL FLOW   USED      LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION     LB/1K      LB/1K     EMISSION
          MIN.      LB/HR      LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS       LBS.      LB FUEL     HOURS       LBS.
   2     12.00      16.70      3.34     1095.35   18292.30     3.658      91.18    1522.74      0.305       0.14        2.33     0.0005
   6      0.30      97.70      0.49      997.49   97455.06     0.487      14.46    1412.74      0.007       0.69       67.59     0.0003
   7      5.00      71.30      5.92      599.25   42726.32     3.546       8.36     595.78      0.049       2.29      163.23     0.0136
   9      6.00      42.00      4.20      820.86   34476.13     3.448       9.37     393.74      0.039       5.27      221.52     0.0222
  10      4.00      15.80      1.06     1133.35   17906.95     1.200      91.09    1439.19      0.096       0.10        1.62     0.0001

TOTAL FOR CYCLE                15.005                          12.339                           0.497                             0.0366

TOTAL FOR CYCLE/LB FUEL                                         0.822                           0.033                             0.0024
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DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 366 ENGINE TYPE AND MODEL: TSIO-520-E SERIAL NUMBER: 206193-9-E

RATED HORSEPOWER: 300.

ENGINE TOTAL TIME: 214. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 91.00 FINISH 89.50

ATMOSPHERIC PRESSURE: START 30.20 FINISH 30.20

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 53.C0 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASUPED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	96.70	1044.00	0.08043
IDLE/TAXI		2	-0.0	35.20	466.00	0.07672
RUN UP		3	-0.0	49.20	635.00	0.07881
RUN UP-LEAN		4	-0.0	43.90	585.00	0.07794
RUN UP-RICH		5	-0.0	24.60	324.00	0.07888
TAKE-OFF		6	-0.0	105.50	1504.00	0.07393
CLIMB		7	-0.0	84.40	1142.00	0.07758
DESCENT		8	-0.0	77.40	997.00	0.08081
APPROACH		9	-0.0	58.00	697.00	0.08007
TAXI		10	-0.0	40.40	483.00	0.08212

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	504.00	-0.00	4.60	9.80	31258.00	17.00	-C.00	-0.00	40.00	-0.00	-0.00
2	594.00	-0.00	4.40	12.00	4821.00	44.00	-0.00	-0.00	27.00	-0.00	-0.00
3	642.00	-0.00	5.70	11.60	21.46	246.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	908.00	-0.00	4.70	12.30	1700.00	150.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	964.00	-0.00	5.10	12.10	1588.00	160.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1278.00	-0.00	2.20	14.10	1310.00	1904.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1312.00	-0.00	4.20	12.80	1310.00	812.00	-0.00	-0.00	20.00	-0.00	-0.00
8	1244.00	-0.00	5.90	11.70	1477.00	261.00	-C.00	-0.00	9.00	-0.00	-0.00
9	1110.00	-0.00	7.70	9.50	2034.00	155.00	-0.00	-0.00	29.00	-0.00	-0.00
10	886.00	-0.00	7.60	9.50	7496.00	48.00	-C.00	-0.00	14.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	530.25	206.36	0.0	1774.96	0.32	0.32	51275.28	19955.23	0.0	171638.38	31.13	31.13
2	526.54	33.04	0.0	2256.29	0.86	0.86	18534.05	1163.06	0.0	79421.38	30.44	30.44
3	665.54	0.14	0.0	2128.13	4.72	4.72	32744.73	7.06	0.0	104703.94	232.13	232.13
4	553.01	11.46	0.0	2273.92	2.90	2.90	24276.91	502.91	0.0	99825.00	127.26	127.26
5	593.54	10.58	0.0	2212.61	3.06	3.06	14601.15	260.38	0.0	54430.28	75.24	75.24
6	270.50	9.22	0.0	2723.93	38.45	38.45	28537.27	973.21	0.0	287374.00	4056.74	4056.74
7	495.30	8.85	0.0	2371.74	15.73	15.73	41803.28	746.75	0.0	200174.88	1327.51	1327.51
8	671.60	9.63	0.0	2092.59	4.88	4.88	51981.93	745.29	0.0	161966.31	377.71	377.71
9	893.84	13.52	0.0	1732.73	2.96	2.96	51842.56	784.32	0.0	100498.06	171.41	171.41
10	860.18	48.59	0.0	1689.41	0.89	0.89	34751.08	1963.04	0.0	68252.13	36.05	36.05

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	35.20	7.04	526.54	18534.05	3.707	33.04	1163.06	0.233	0.86	30.44	0.0061
6	0.30	105.50	0.53	270.50	28537.27	0.143	9.22	973.21	0.005	38.45	4056.74	0.0203
7	5.00	84.40	7.01	495.30	41803.28	3.470	8.85	746.75	0.062	15.73	1327.51	0.1102
9	6.00	58.00	5.80	893.84	51842.56	5.184	13.52	784.32	0.078	2.96	171.41	0.0171
10	4.00	40.40	2.71	860.18	34751.08	2.328	48.59	1963.04	0.132	0.89	36.05	0.0024
TOTAL FOR CYCLE			23.079			14.832			0.509			0.1561
TOTAL FOR CYCLE/LB FUEL						0.643			0.022			0.0068

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DATE:   8/17/71
TEST ORGANIZATION:  SCOTT/GEN AVIATION
ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL
ENGINE DATA ************************************************************************************************
    CAL ID NUMBER:  367    ENGINE TYPE AND MODEL:  TSIO-520-E              SERIAL NUMBER:   206193-9-EA
                           RATED HORSEPOWER:   300.
    ENGINE TOTAL TIME:    214. HRS
    FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840
OPERATIONAL DATA *******************************************************************************************
    INLET AIR TEMPERATURE, DEGREES F:  START   76.50   FINISH   77.50
    ATMOSPHERIC PRESSURE:              START   30.16   FINISH   30.16
    INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.02
    RELATIVE HUMIDITY:                     79.00  PERCENT
    SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00
    SAMPLE LINE TRANSPORT TIME, SEC:    1.60
 NUMBER OF TESTS:  10
 COMMENTS:


                      CARB.    TEST      ENGINE      MEASURED      MEASURED      CALCULATED
                      HEATER   MODE       RPM        FUEL FLOW     AIR FLOW         F/A
                                                      LB/HR         LB/HR

                                 1         -0.0        -0.00         -0.00        0.07122
IDLE-LOW                         2         -0.0        33.40        431.00        0.07196
IDLE/TAXI                        3         -0.0        51.00        631.00        0.07635
RUN UP                           4         -0.0        45.70        579.00        0.07413
RUN UP-LEAN                      5         -0.0        28.10        353.00        0.07420
RUN UP-RICH                      6         -0.0       126.60       1706.00        0.07032
TAKE-OFF                         7         -0.0        98.40       1251.00        0.07397
CLIMB                            8         -0.0        87.90       1080.00        0.07528
DESCENT                          9         -0.0        58.00        695.00        0.07746
APPROACH                        10         -0.0        36.90        443.00        0.07720
TAXI

  TEST   EXHAUST     EXHAUST      CO          CO         THC        NO         NO          NO       ALDEHYDES    SMOKE    PARTICULATES
  MODE    GAS         GAS        (DRY)         2        (DRY)      (DRY)        2           X        (DRY)
          TEMP      PRESSURE   PERCENT V    (DRY)       PPMV       PPMV       (DRY)       (DRY)
        DEGREES F     PSIA                PERCENT V                           PPMV        PPMV

                                                                                                                     -0.00
   1     605.00      -0.00        4.50        8.40   25238.00     13.00      -0.00       -0.00      29.00      -0.00      -0.00
   2     673.00      -0.00        4.60       10.40    7211.00     47.00      -0.00       -0.00      12.00      -0.00      -0.00
   3     953.00      -0.00        6.60        9.80    2240.00    200.00      -0.00       -0.00      -0.00      -0.00      -0.00
   4     930.00      -0.00        5.80       10.20    1748.00    127.00      -0.00       -0.00      -0.00      -0.00      -0.00
   5     998.00      -0.00        6.00       10.00    1748.00    127.00      -0.00       -0.00      -0.00      -0.00      -0.00
   6      -0.00      -0.00        3.80       11.50    1420.00    999.00      -0.00       -0.00      -0.00      -0.00      -0.00
   7      -0.00      -0.00        5.70       10.30    1475.00    219.00      -0.00       -0.00       5.00      -0.00      -0.00
   8      -0.00      -0.00        6.70        9.50    1693.00    169.00      -0.00       -0.00       4.00      -0.00      -0.00
   9      -0.00      -0.00        7.50        9.10    2076.00    144.00      -0.00       -0.00       8.00      -0.00      -0.00
  10      -0.00      -0.00        7.00        9.10    6555.00     52.00      -C.00       -0.00      10.00      -0.00

  TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE      CO         HC        NO2        CO2         NO        NOX         CO         HC        NO2        CO2         NO        NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1     589.42     189.33       0.0     1728.73       0.28       0.28      -0.00      -0.00       0.0        -0.00      -0.00      -0.00
   2     591.12      53.07       0.0     2099.86       0.99       0.99   19743.44    1772.58       0.0     70135.31      33.13      33.13
   3     802.07      15.59       0.0     1871.25       3.99       3.99   40905.38     795.11       0.0     95433.50     203.60     203.60
   4     724.42      12.50       0.0     2001.71       2.61       2.61   33136.02     571.43       0.0     91472.19     119.07     119.07
   5     749.40      12.50       0.0     1962.46       7.61       2.61   21058.15     351.36       0.0     55145.17      73.21      73.21
   6     497.14      10.64       0.0     2363.93      21.47      21.47   62938.32    1346.99       0.0    299273.19    2717.80    2717.80
   7     713.13      10.57       0.0     2024.75       4.50       4.50   70172.31    1039.99       0.0    199235.50     442.85     442.85
   8     826.89      11.97       0.0     1842.19       3.43       3.43   72683.38    1051.87       0.0    161928.19     301.14     301.14
   9     901.48      14.29       0.0     1718.60       2.84       2.84   52285.99     828.89       0.0     99679.00     164.89     164.89
  10     844.00      45.26       0.0     1723.95       1.03       1.03   31143.60    1670.28       0.0     63613.68      38.00      38.00

                                                         LTO CYCLE EMISSIONS

  TEST   TIME IN   MEASURED     FUEL        CO          CO         CO         HC         HC          HC         NO         NO         NO
  MOUE    MODE     FUEL FLOW    USED       LB/1K       LB/1K    EMISSION     LB/1K      LB/1K    EMISSION     LB/1K      LB/1K    EMISSION
          MIN.       LB/HR      LBS.      LB FUEL      HOURS      LBS.      LB FUEL     HOURS       LBS.     LB FUEL      HOURS      LBS.

   2      12.00      33.40      6.68      591.12    19743.44     3.949      53.07    1772.58      0.355       0.99      33.13     0.0066
   6       0.30     126.60      0.63      497.14    62938.32     0.315      10.64    1346.99      0.007      21.47    2717.80     0.0136
   7       5.00      98.40      8.17      713.13    70172.31     5.824      10.57    1039.99      0.086       4.50     442.85     0.0368
   9       6.00      58.00      5.80      901.48    52285.99     5.229      14.29     828.89      0.083       2.84     164.89     0.0165
  10       4.00      36.90      2.47      844.00    31143.60     2.087      45.26    1670.28      0.112       1.03      38.00     0.0025

                                                                                                                      0.0760
TOTAL FOR CYCLF                23.752                           17.403                            0.642

                                                                                                                      0.0032
TOTAL FOR CYCLE/LB FUEL                                          0.733                            0.027
```

9975

DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 368   ENGINE TYPE AND MODEL: TSIO-520-E   SERIAL NUMBER: 206193-9-E

RATED HORSEPOWER: 300.

ENGINE TOTAL TIME: 214. HRS

FUEL: AV GAS 100/130   FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 78.00 FINISH 77.00

ATMOSPHERIC PRESSURE: START 30.14 FINISH 30.14

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 77.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	-0.00	-0.00	0.08215
IDLE/TAXI		2	-0.0	33.40	415.00	0.07995
RUN UP		3	-0.0	52.70	619.00	0.08007
RUN UP-LEAN		4	-0.0	49.20	593.00	0.07877
RUN UP-RICH		5	-0.0	29.90	381.00	0.07539
TAKE-OFF		6	-0.0	110.80	1564.00	0.06939
CLIMB		7	-0.0	102.00	1330.00	0.07371
DESCENT		8	-0.0	93.20	1176.00	0.07675
APPROACH		9	-0.0	59.80	725.00	0.07864
TAXI		10	-0.0	38.70	472.00	0.07920

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	404.00	-0.00	5.10	9.10	36416.00	16.00	-0.00	-0.00	32.00	-0.00	-0.00
2	583.00	-0.00	6.20	10.30	9490.00	39.00	-0.00	-0.00	26.00	-0.00	-0.00
3	942.00	-0.00	8.20	8.90	2538.00	238.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	897.00	-0.00	7.50	9.40	2152.00	82.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	986.00	-0.00	5.80	10.50	1710.00	128.60	-0.00	-0.00	-0.00	-0.00	-0.00
6	1256.00	-0.00	2.40	12.80	1324.00	1842.00	-0.00	-0.00	6.00	-0.00	-0.00
7	1244.00	-0.00	5.00	11.00	1435.00	543.00	-0.00	-0.00	8.00	-0.00	-0.00
8	1233.00	-0.00	6.10	10.40	1490.00	334.00	-0.00	-0.00	3.00	-0.00	-0.00
9	1076.00	-0.00	7.30	9.60	2042.00	187.00	-0.00	-0.00	2.00	-0.00	-0.00
10	852.00	-0.00	7.00	9.80	4414.00	72.00	-0.00	-0.00			

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	577.48	236.16	0.0	1619.00	0.30	0.30	-0.00	-0.00	0.0	-0.00	-0.00	-0.00
2	717.83	62.93	0.0	1873.73	0.74	0.74	23975.59	2101.79	0.0	62582.52	24.77	24.77
3	954.60	16.92	0.0	1627.93	4.55	4.55	50307.37	891.77	0.0	85791.81	239.84	239.84
4	885.28	14.55	0.0	1743.36	1.59	1.59	43555.82	715.77	0.0	85773.00	70.22	78.22
5	711.39	12.01	0.0	2023.53	2.58	2.58	21270.66	359.17	0.0	60503.49	77.11	77.11
6	316.23	9.99	0.0	2649.96	39.87	39.87	35038.24	1107.04	0.0	293615.69	4417.14	4417.14
7	625.71	10.28	0.0	2162.89	11.16	11.16	63822.55	1049.06	0.0	220615.06	1138.48	1138.48
8	740.19	10.35	0.0	1982.83	6.66	6.66	68985.69	965.07	0.0	184799.56	620.43	620.43
9	862.23	13.81	0.0	1781.59	3.63	3.63	51561.20	826.04	0.0	106539.19	216.95	216.95
10	820.21	29.62	0.0	1804.24	1.39	1.39	31742.28	1146.35	0.0	69823.94	53.63	53.63

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	33.40	6.68	717.83	23975.59	4.795	62.93	2101.79	0.420	0.74	24.77	0.0050
6	0.30	110.80	0.55	316.23	35038.24	0.175	9.99	1107.04	0.006	39.87	4417.14	0.0221
7	5.00	102.00	8.47	625.71	63822.55	5.297	10.28	1049.06	0.087	11.16	1138.48	0.0945
9	6.00	59.80	5.98	862.23	51561.20	5.156	13.81	826.04	0.083	3.63	216.95	0.0217
10	4.00	38.70	2.59	820.21	31742.28	2.127	29.62	1146.35	0.077	1.39	53.63	0.0036
TOTAL FOR CYCLE			24.273			17.550			0.672			0.1468
TOTAL FOR CYCLE/LB FUEL						0.723			0.028			0.0060

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DATE:   8/17/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  369    ENGINE TYPE AND MODEL:  TSIO-520-E                 SERIAL NUMBER:   206211-9-E

                            RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:    214. HRS

     FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840
****************************************************************************************************************
OPERATIONAL DATA ***********************************************************************************************
     INLET AIR TEMPERATURE, DEGREES F:  START   75.50   FINISH   75.50

     ATMOSPHERIC PRESSURE:              START   30.14   FINISH   30.14

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                    78.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:     7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  10

 COMMENTS:


                    CARB.      TEST      ENGINE        MEASURED        MEASURED         CALCULATED
                    HEATER     MODE       RPM          FUEL FLOW       AIR FLOW            F/A
                                                         LB/HR           LB/HR

IDLE-LOW                        1         -0.0          -0.00           -0.00           0.09374
IDLE/TAXI                       2         -0.0          22.90          223.00           0.09162
RUN UP                          3         -0.0          45.70          497.00           0.08394
RUN UP-LEAN                     4         -0.0          45.70          509.00           0.08219
RUN UP-RICH                     5         -0.0          43.90          488.00           0.08264
TAKE-OFF                        6         -0.0         130.10         1703.00           0.07293
CLIMB                           7         -0.0         116.00         1344.00           0.07950
DESCENT                         8         -0.0         107.20         1235.00           0.C8000
APPROACH                        9         -0.0          59.80          640.00           0.08414
TAXI                           10         -0.0          19.30          200.00           0.08524


                                                                      NO          NO      ALDEHYDES     SMOKE      PARTICULATES
   TEST   EXHAUST    EXHAUST       CO          CO        THC          NO           2           X       (DRY)
   MODE     GAS        GAS        (DRY)         2       (DRY)       (DRY)       (DRY)       (DRY)
            TEMP    PRESSURE   PERCENT V     (DRY)      PPMV        PPMV        PPMV        PPMV
         DEGREES F    PSIA                 PERCENT V

     1     471.00     -0.00        6.60      7.80   58304.00       15.00       -0.00       -0.00       27.00      -0.00        -0.00
     2     560.00     -0.00        8.90      7.90   29646.00       22.00       -0.00       -0.00        6.00      -0.00        -0.00
     3     930.00     -0.00       10.30      7.40    3568.00       54.00       -0.00       -0.00       -0.00      -0.00        -0.00
9979 4     908.00     -0.00        9.60      7.80    3184.00       47.00       -C.00       -0.00       -0.00      -0.00        -0.00
     5     964.00     -0.00        9.70      7.80    3129.00       48.00       -0.00       -0.00       -0.00      -0.00        -0.00
     6    1289.00     -0.00        4.80     11.00    1757.00      716.00       -0.00       -0.00       -0.00      -0.00        -0.00
     7    1267.00     -0.00        9.50      8.50    1976.00      145.00       -0.00       -0.00        5.00      -0.00        -0.00
     8    1267.00     -0.00        8.70      8.40    1976.00      135.00       -0.00       -0.00       19.00      -0.00        -0.00
     9    1076.00     -0.00       10.70      7.10    2745.00       54.00       -0.00       -0.00       55.00      -0.00        -0.00
    10     841.00     -0.00        8.90      7.80   16799.00       34.00       -0.00       -0.00       46.00      -0.00        -0.00


                                                                                                                MASS EMI   MASS EMI
   TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI      NO        NOX
   MODE      CO         HC         NO2        CO2        NO        NOX         CO         HC         NO2        CO2       LB/HR      LB/HR
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

     1     659.08     333.46       0.0     1223.86       0.25       0.25       -0.00      -0.00       0.0        -0.00      -0.00      -0.00
     2     909.71     173.55       0.0     1268.76       0.37       0.37    20832.38    3974.30       0.0     29054.56       8.46       8.46
     3    1152.39      22.86       0.0     1300.86       0.99       0.99    52664.07    1044.83       0.0     59449.36      45.35      45.35
     4    1094.58      20.79       0.0     1397.37       0.88       0.88    50022.43     950.19       0.0     63859.60      40.23      40.23
     5    1100.12      20.32       0.0     1389.95       0.89       0.89    48295.13     892.24       0.0     61018.92      39.25      39.25
     6     606.99      12.73       0.0     2185.61      14.87      14.87    78969.63    1655.53       0.0    284347.88    1934.87    1934.87
     7     998.51      13.29       0.0     1568.89       2.80       2.80   115827.25    1542.14       0.0    181990.69     324.55     324.55
     8    1016.10      13.22       0.0     1541.46       2.59       2.59   108925.56    1416.91       0.0    165244.88     277.63     277.63
     9    1195.97      17.57       0.0     1246.90       0.99       0.99    71518.81    1050.81       0.0     74564.63      59.29      59.29
    10     978.25     105.75       0.0     1347.07       0.61       0.61    18880.16    2041.01       0.0     25998.50      11.85      11.85


                                                            LTO CYCLE EMISSIONS

                                                                                                          NO         NO         NO
   TEST   TIME IN   MEASURED     FUEL        CO          CO          CO          HC          HC         HC        LB/1K      LB/1K     EMISSION
   MODE     MODE    FUEL FLOW    USED      LB/1K       LB/1K      EMISSION     LB/1K       LB/1K    EMISSION    LB FUEL    HOURS        LBS.
            MIN.      LB/HR      LBS.     LB FUEL      HOURS        LBS.      LB FUEL      HOURS      LBS.

     2     12.00      22.90      4.58     909.71    20832.38      4.166      173.55     3974.30     0.795       0.37       8.46     0.0017
     6      0.30     130.10      0.65     606.99    78969.63      0.395       12.73     1655.53     0.008      14.87    1934.87     0.0097
     7      5.00     116.00      9.63     998.51   115827.25      9.614       13.29     1542.14     0.128       2.80     324.55     0.0269
     9      6.00      59.80      5.98    1195.97    71518.81      7.152       17.57     1050.81     0.105       0.99      59.29     0.0059
    10      4.00      19.30      1.29     978.25    18880.16      1.265      105.75     2041.01     0.137       0.61      11.85     0.0008

 TOTAL FOR CYCLE                22.132                           22.592                            1.173                          0.0450

 TOTAL FOR CYCLE/LB FUEL                                          1.021                            0.053                          0.0020
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DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 370 ENGINE TYPE AND MODEL: TSIO-520-E SERIAL NUMBER: 206211-9-EA

RATED HORSEPOWER: 300.

ENGINE TOTAL TIME: 214. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 75.00 FINISH 74.00

ATMOSPHERIC PRESSURE: START 30.14 FINISH 30.14

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 78.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	-0.00	-0.00	0.09587
IDLE/TAXI		2	-0.0	19.30	181.00	0.28822
RUN UP		3	-0.0	47.50	514.00	0.08137
RUN UP-LEAN		4	-0.0	45.70	508.00	0.07919
RUN UP-RICH		5	-0.0	45.70	503.00	0.07964
TAKE-OFF		6	-0.0	128.30	1696.00	0.06984
CLIMB		7	-0.0	114.30	1368.00	0.07518
DESCENT		8	-0.0	105.50	1231.00	0.07672
APPROACH		9	-0.0	58.00	619.00	0.08103
TAXI		10	-0.0	19.30	201.00	0.08136

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	448.00	-0.00	6.80	5.80	79056.00	9.00	-0.00	-0.00	19.00	-0.00	-0.00
2	583.00	-0.00	9.90	66.60	29317.00	19.00	-0.00	-0.00	5.00	-0.00	-0.00
3	919.00	-0.00	10.00	7.10	3843.00	52.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	897.00	-0.00	9.20	7.50	3514.00	47.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	964.00	-0.00	9.50	7.30	3294.00	47.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1767.00	-0.00	4.30	10.80	1867.00	789.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1278.00	-0.00	7.30	8.80	1921.00	207.00	-0.00	-0.00	8.00	-0.00	-0.00
8	1278.00	-0.00	8.00	8.40	1921.00	148.00	-0.00	-0.00	17.00	-0.00	-0.00
9	1087.00	-0.00	10.30	6.80	2855.00	49.00	-0.00	-0.00	53.00	-0.00	-0.00
10	863.00	-0.00	8.60	7.40	15152.00	37.00	-0.00	-0.00	62.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	669.94	446.08	0.0	897.83	0.15	0.15	-0.00	-0.00	0.0	-0.00	-0.00	-0.00
2	229.25	43.25	0.0	2695.40	0.08	0.08	4424.43	834.70	0.0	52021.16	1.55	1.55
3	1155.46	25.43	0.0	1288.99	0.99	0.94	54884.18	1207.99	0.0	61227.08	46.88	46.88
4	1090.01	23.84	0.0	1396.18	0.91	0.91	49813.35	1089.69	0.0	63805.40	41.80	41.80
5	1120.43	22.25	0.0	1352.76	0.91	0.91	51203.47	1016.82	0.0	61821.13	41.61	41.61
6	568.27	14.13	0.0	2242.59	17.13	17.13	72909.25	1813.03	0.0	287724.31	2197.41	2197.41
7	905.21	13.64	0.0	1714.53	4.22	4.72	103465.00	1559.35	0.0	195971.00	481.91	481.91
8	974.07	13.40	0.0	1607.01	2.96	2.96	102764.44	1413.27	0.0	169539.25	312.27	312.27
9	1196.88	19.00	0.0	1241.54	0.94	0.94	69419.25	1102.03	0.0	72009.44	54.24	54.24
10	991.94	100.09	0.0	1341.09	0.70	0.70	19144.41	1931.79	0.0	25882.93	13.53	13.53

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	19.30	3.86	229.25	4424.43	0.885	43.25	834.70	0.167	0.08	1.55	0.0003
6	0.30	128.30	0.64	568.27	72909.25	0.365	14.13	1813.03	0.009	17.13	2197.41	0.0110
7	5.00	114.30	9.49	905.21	103465.00	8.588	13.64	1559.35	0.129	4.22	481.91	0.0400
9	6.00	58.00	5.80	1196.88	69419.25	6.942	19.00	1102.03	0.110	0.94	54.24	0.0054
10	4.00	19.30	1.29	991.94	19144.41	1.283	100.09	1931.79	0.129	0.70	13.53	0.0009
TOTAL FOR CYCLE			21.081			18.062			0.545			0.0576
TOTAL FOR CYCLE/LB FUEL						0.857			0.026			0.0027

DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: TELEDYNE-CONTINENTAL

ENGINE DATA **

CAL ID NUMBER: 371 ENGINE TYPE AND MODEL: TSIO-520-E SERIAL NUMBER: 206211-9-E8

RATED HORSEPOWER: 300.

ENGINE TOTAL TIME: 214. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 73.00 FINISH 73.00

ATMOSPHERIC PRESSURE: START 30.14 FINISH 30.14

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 8.20 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	-0.00	-0.00	0.07262
IDLE/TAXI		2	-0.0	22.90	256.00	0.07531
RUN UP		3	-0.0	47.50	529.00	0.08396
RUN UP-LEAN		4	-0.0	45.70	519.00	0.08140
RUN UP-RICH		5	-0.0	43.90	495.00	0.08232
TAKE-OFF		6	-0.0	128.30	1720.00	0.07178
CLIMB		7	-0.0	114.30	1367.00	0.07865
DESCENT		8	-0.0	105.50	1233.00	0.08024
APPROACH		9	-0.0	56.30	598.00	0.08608
TAXI		10	-0.0	21.10	218.00	0.08592

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TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	448.00	-0.00	4.50	8.70	25483.00	18.00	-0.00	-0.00	27.00	-0.00	-0.00
2	560.00	-0.00	5.20	9.10	20567.00	32.00	-0.00	-0.00	23.00	-0.00	-0.00
3	930.00	-0.00	9.80	8.09	3141.00	71.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	919.00	-0.00	9.10	8.20	2813.00	58.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	964.00	-0.00	9.40	8.10	2704.00	57.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1334.00	-0.00	4.10	11.50	1611.00	1058.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1300.00	-0.00	7.70	9.20	1721.00	207.00	-0.00	-0.00	25.00	-0.00	-0.00
8	1278.00	-0.00	8.40	8.80	1830.00	144.00	-0.00	-0.00	29.00	-0.00	-0.00
9	1076.00	-0.00	11.10	7.10	2868.00	47.00	-0.00	-0.00	8.00	-0.00	-0.00
10	852.00	-0.00	8.90	7.80	18273.00	34.00	-0.00	-0.00	19.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	577.27	187.23	0.0	1753.58	0.38	0.38	-0.00	-0.00	0.0	-0.00	-0.00	-0.00
2	642.26	145.49	0.0	1765.98	0.65	0.65	14707.70	3331.64	0.0	40440.92	14.87	14.87
3	1092.98	20.06	0.0	1401.89	1.30	1.30	51916.43	953.00	0.0	66589.63	61.78	61.78
4	1045.66	18.51	0.0	1480.48	1.09	1.09	47786.85	846.02	0.0	67658.00	50.03	50.03
5	1068.64	17.61	0.0	1446.86	1.06	1.06	46913.41	772.90	0.0	63517.33	46.73	46.73
6	525.53	11.83	0.0	2316.07	22.28	22.28	67425.69	1517.34	0.0	297151.31	2857.90	2857.90
7	911.18	11.66	0.0	1710.57	4.02	4.02	104148.13	1333.17	0.0	195518.19	459.89	459.89
8	976.24	12.18	0.0	1606.93	2.75	2.75	102993.19	1285.07	0.0	169531.38	290.01	290.01
9	1213.01	17.95	0.0	1219.09	0.84	0.84	68292.19	1010.58	0.0	68634.88	47.50	47.50
10	970.46	114.12	0.0	1336.36	0.61	0.61	20476.79	2407.84	0.0	28197.11	12.85	12.85

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	22.90	4.58	642.26	14707.70	2.942	145.49	3331.64	0.666	0.65	14.87	0.0030
6	0.30	128.30	0.64	525.53	67425.69	0.337	11.83	1517.34	0.008	22.28	2857.90	0.0143
7	5.00	114.30	9.49	911.18	104148.13	8.644	11.66	1333.17	0.111	4.02	459.89	0.0382
9	6.00	56.30	5.63	1213.01	68292.19	6.829	17.95	1010.58	0.101	0.84	47.50	0.0047
10	4.00	21.10	1.41	970.46	20476.79	1.372	114.12	2407.84	0.161	0.61	12.85	0.0009
TOTAL FOR CYCLE			21.752			20.124			1.047			0.0610
TOTAL FOR CYCLE/LB FUEL						0.925			0.048			0.0028

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DATE:   7/28/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ****************************************************************************************

     CAL ID NUMBER:  244    ENGINE TYPE AND MODEL:  IO-540-C4B5            SERIAL NUMBER:   L-6246-48AA

                            RATED HORSEPOWER:   250.

     ENGINE TOTAL TIME:   1747. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    77.00   FINISH   77.00

     ATMOSPHERIC PRESSURE:              START    29.82   FINISH   29.82

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     60.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  10

COMMENTS:



                     CARB.    TEST      ENGINE        MEASURED        MEASURED       CALCULATED
                     HEATER   MODE      RPM           FUEL FLOW       AIR FLOW        F/A
                                                       LB/HR           LB/HR

IDLE-LOW                        1        -0.0           15.20          135.00         0.08444
IDLE/TAXI                       2        -0.0           17.60          194.00         0.07694
RUN UP                          3        -0.0           56.30          605.00         0.07852
RUN UP-LEAN                     4        -0.0           56.30          613.00         0.07740
RUN UP-RICH                     5        -0.0           57.40          632.00         0.08301
TAKE-OFF                        6        -0.0          117.20         1261.00         0.09688
CLIMB                           7        -0.0          105.50         1138.00         0.08237
DESCENT                         8        -0.0           78.50          847.00         0.07789
APPROACH                        9        -0.0           46.90          512.00         0.07518
TAXI                           10        -0.0           17.60          149.00         0.08555


  TEST   EXHAUST     EXHAUST        CO         CO          THC         NO          NO          NO       ALDEHYDES     SMOKE     PARTICULATES
  MODE     GAS         GAS         (DRY)        2          (DRY)      (DRY)         2           X         (DRY)
          TEMP       PRESSURE   PERCENT V    (DRY)         PPMV       PPMV        (DRY)       (DRY)
        DEGREES F     PSIA                 PERCENT V                               PPMV        PPMV

   1     740.00      -0.00         9.50        5.60   29243.00       7.00       -0.00       -0.00       28.00       -0.00         -0.00
   2     762.00      -0.00         8.50        7.10    9411.00      24.00       -0.00       -0.00        5.00       -0.00         -0.00
   3    1211.00      -0.00         9.80        6.70    3417.00      65.00       -0.00       -0.00       -0.00       -0.00         -0.00
   4    1278.00      -0.00         9.40        6.90    3193.00      53.00       -0.00       -0.00       -0.00       -0.00         -0.00
   5    1256.00      -0.00        10.00        7.60    2745.00      50.00       -0.00       -0.00       -0.00       -0.00         -0.00
   6    1323.00      -0.00        12.30        8.30    3081.00      84.00       -0.00       -0.00       -0.00       -0.00         -0.00
   7    1244.00      -0.00        10.30        7.10    2969.00      58.00       -0.00       -0.00        7.00       -0.00         -0.00
   8    1211.00      -0.00         9.70        6.70    3081.00      60.00       -0.00       -0.00        6.00       -0.00         -0.00
   9    1121.00      -0.00         7.10        6.70    3305.00      67.00       -0.00       -0.00        6.00       -0.00         -0.00
  10     785.00      -0.00        10.30        5.00   29075.00      10.00       -0.00       -0.00       22.00       -0.00         -0.00


  TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE       CO         HC         NO2        CO2         NO         NOX        CO         HC         NO2        CO2         NO         NOX
           LB/1K      LB/1K      LB/1K      LB/1K       LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR       LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL     LB FUEL    LB FUEL

   1     1064.80     187.72       0.0       986.21       0.13       0.13  16184.92    2853.34       0.0   14990.40        1.96       1.96
   2     1038.14      65.83       0.0      1362.49       0.48       0.48  18271.27    1158.59       0.0   23979.82        8.47       8.47
   3     1175.55      23.48       0.0      1262.78       1.28       1.28  66183.56    1321.64       0.0   71094.63       72.10      72.10
   4     1142.66      22.23       0.0      1317.88       1.06       1.06  64331.74    1251.53       0.0   74196.69       59.58      59.58
   5     1130.23      17.77       0.0      1349.65       0.93       0.93  64875.35    1019.92       0.0   77469.56       53.28      53.28
   6     1188.48      17.05       0.0      1260.10       1.33       1.33 139290.06    1998.26       0.0  147683.31      156.25     156.25
   7     1175.82      19.41       0.0      1273.51       1.09       1.09 124049.25    2047.92       0.0  134354.89      114.74     114.74
   8     1172.86      21.34       0.0      1272.88       1.19       1.19  92069.50    1674.87       0.0   99921.13       93.54      93.54
   9     1139.71      23.71       0.0      1318.46       1.38       1.38  53452.51    1111.84       0.0   61835.74       64.64      64.64
  10     1142.85     184.76       0.0       871.69       0.18       0.18  20114.12    3251.84       0.0   15341.65        3.21       3.21


                                                      LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED     FUEL        CO          CO          CO          HC         HC          HC          NO         NO          NO
  MODE     MODE     FUEL FLOW    USED       LB/1K       LB/1K     EMISSION     LB/1K      LB/1K     EMISSION     LB/1K      LB/1K     EMISSION
           MIN.      LB/HR       LBS.      LB FUEL      HOURS       LBS.      LB FUEL     HOURS       LBS.      LB FUEL     HOURS       LBS.

   2      12.00      17.60       3.52     1038.14    18271.27      3.654      65.83    1158.59      0.232       0.48        8.47     0.0017
   6       0.30     117.20       0.59     1188.48   139290.06      0.696      17.05    1998.26      0.010       1.33      156.25     0.0008
   7       5.00     105.50       8.76     1175.82   124049.25     10.296      19.41    2047.92      0.170       1.09      114.74     0.0095
   9       6.00      46.90       4.69     1139.71    53452.51      5.345      23.71    1111.84      0.111       1.38       64.64     0.0065
  10       4.00      17.60       1.18     1142.85    20114.12      1.348     184.76    3251.84      0.218       0.18        3.21     0.0002

TOTAL FOR CYCLE                 18.732                             21.340                           0.741                             0.0187

TOTAL FOR CYCLE/LB FUEL                                             1.139                           0.040                             0.0010
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DATE:   7/28/71
TEST ORGANIZATION:  SCOTT/GEN AVIATION
ENGINE SUPPLIER:  LYCOMING
ENGINE DATA ******************************************************************************************
    CAL ID NUMBER:  245    ENGINE TYPE AND MODEL:  IO-540-C4B5            SERIAL NUMBER:   L-6246-48
                           RATED HORSEPOWER:   250.
    ENGINE TOTAL TIME:   1746. HRS
    FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840
OPERATIONAL DATA *************************************************************************************
    INLET AIR TEMPERATURE, DEGREES F:  START   82.00   FINISH   83.00
    ATMOSPHERIC PRESSURE:              START   29.82   FINISH   29.82
    INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01
    RELATIVE HUMIDITY:                     52.00  PERCENT
    SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00
    SAMPLE LINE TRANSPORT TIME, SEC:    1.60
NUMBER OF TESTS:  10
COMMENTS:


                         CARB.    TEST      ENGINE        MEASURED        MEASURED       CALCULATED
                         HEATER   MODE       RPM          FUEL FLOW       AIR FLOW          F/A
                                                            LB/HR          LB/HR

IDLE-LOW                           1         -0.0          17.60          128.00         0.08173
IDLE/TAXI                          2         -0.0          19.90          195.00         0.07451
RUN UP                             3         -0.0          52.70          572.00         0.07261
RUN UP-LEAN                        4         -0.0          51.60          562.00         0.07237
RUN UP-RICH                        5         -0.0          51.60          563.00         0.07148
TAKE-OFF                           6         -0.0         140.60         1488.00         0.08428
CLIMB                              7         -0.0         111.30         1165.00         0.08426
DESCENT                            8         -0.0          99.60         1053.00         0.08958
APPROACH                           9         -0.0          60.90          644.00         0.08464
TAXI                              10         -0.0          15.20          124.00         0.09538


    TEST   EXHAUST      EXHAUST       CO          CO          THC         NO          NO          NO      ALDEHYDES     SMOKE      PARTICULATES
    MODE     GAS          GAS        (DRY)         2         (DRY)       (DRY)         2           X        (DRY)
            TEMP       PRESSURE   PERCENT V     (DRY)        PPMV        PPMV        (DRY)       (DRY)
          DEGREES F      PSIA               PERCENT V                              PPMV        PPMV

     1     572.00       -0.00         7.30        4.50   55740.00      15.00       -0.00       -0.00       40.00       -0.00         -0.00
     2     684.00       -0.00         7.50        6.30   21680.00      40.00       -0.00       -0.00       31.00       -0.00         -0.00
     3    1143.00       -0.00         8.80        6.40    3585.00      76.00       -0.00       -0.00       -0.00       -0.00         -0.00
0001 4    1143.00       -0.00         8.40        6.40    7115.00      59.00       -0.00       -0.00       -0.00       -0.00         -0.00
     5    1177.00       -0.00         8.60        6.40    3193.00      61.00       -0.00       -0.00       -0.00       -0.00         -0.00
     6    1278.00       -0.00        10.90        6.90    2857.00      78.00       -0.00       -0.00       -0.00       -0.00         -0.00
     7    1278.00       -0.00        11.10        6.70    2633.00      43.00       -0.00       -0.00       19.00       -0.00         -0.00
     8    1244.00       -0.00        11.70        7.30    2521.00      47.00       -0.00       -0.00        7.00       -0.00         -0.00
     9    1087.00       -0.00        11.00        6.90    2633.00      47.00       -0.00       -0.00        5.00       -0.00         -0.00
    10     762.00       -0.00        11.60        5.10   35965.00      -0.00       -0.00       -0.00       24.00       -0.00         -0.00


    TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
    MODE      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
            LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
           LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

     1     848.84     371.21        0.0     822.15       0.29       0.29  14939.54    6533.21        0.0   14469.89       5.04       5.04
     2     948.88     157.09        0.0    1252.36       0.83       0.83  18882.75    3126.14        0.0   24922.01      16.54      16.54
     3    1142.66      26.66        0.0    1305.73       1.62       1.62  60218.15    1405.01        0.0   68811.81      85.42      85.42
     4    1094.03      53.07        0.0    1309.68       1.26       1.26  56451.69    2738.53        0.0   67579.63      65.13      65.13
     5    1134.13      24.12        0.0    1326.12       1.32       1.32  58520.89    1244.39        0.0   68427.50      68.18      68.18
     6    1217.57      18.28        0.0    1211.03       1.43       1.43 171189.88    2569.85        0.0  170270.31     201.22     201.22
     7    1241.45      16.87        0.0    1177.38       0.79       0.79 138172.81    1877.14        0.0  131042.69      87.92      87.92
     8    1227.75      15.15        0.0    1203.61       0.81       0.81 122283.75    1509.04        0.0  119879.31      80.69      80.69
     9    1223.49      16.77        0.0    1205.85       0.86       0.86  74510.38    1021.46        0.0   73436.38      52.29      52.29
    10    1154.62     205.02        0.0     797.61      -0.00      -0.00  17550.20    3116.38        0.0   12123.64      -0.00      -0.00


                                                   LTO CYCLE EMISSIONS

    TEST   TIME IN   MEASURED     FUEL        CO          CO          CO          HC         HC          HC          NO         NO          NO
    MODF     MODE    FUEL FLOW    USED      LB/1K       LB/1K     EMISSION     LB/1K      LB/1K     EMISSION     LB/1K      LB/1K     EMISSICN
             MIN.      LB/HR      LBS.     LB FUEL      HOURS       LBS.      LB FUEL     HOURS       LBS.      LB FUEL     HOURS       LBS.

     2      12.00      19.90      3.98     948.88    18882.75      3.777     157.09     3126.14     0.625       0.83      16.54     0.0033
     6       0.30     140.60      0.70    1217.57   171189.88      0.856      18.28     2569.85     0.013       1.43     201.22     0.0010
     7       5.00     111.30      9.24    1241.45   138172.81     11.468      16.87     1877.14     0.156       0.79      87.92     0.0073
     9       6.00      60.90      6.09    1223.49    74510.38      7.451      16.77     1021.46     0.102       0.86      52.29     0.0052
    10       4.00      15.20      1.02    1154.62    17550.20      1.176     205.02     3116.38     0.209      -0.00      -0.00    -0.0000

  TOTAL FOR CYCLE                21.029                           24.728                           1.105                          -0.0000

  TOTAL FOR CYCLE/LB FUEL                                          1.176                           0.053                          -0.0000
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DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEM AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 246 ENGINE TYPE AND MODEL: IO-540-C4B5 SERIAL NUMBER: L-6246-48C

RATED HORSEPOWER: 250.

ENGINE TOTAL TIME: 1748. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 82.00 FINISH 82.00

ATMOSPHERIC PRESSURE: START 29.82 FINISH 29.82

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 55.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	17.60	117.00	0.08453
IDLE/TAXI		2	-0.0	21.10	210.00	0.06886
RUN UP		3	-0.0	56.30	597.00	0.07640
RUN UP-LEAN		4	-0.0	56.30	609.00	0.07548
RUN UP-RICH		5	-0.0	56.30	599.00	0.07725
TAKE-OFF		6	-0.0	140.60	1460.00	0.09057
CLIMB		7	-0.0	111.30	1143.00	0.09548
DESCENT		8	-0.0	96.10	1005.00	0.09106
APPROACH		9	-0.0	63.30	662.00	0.08664
TAXI		10	-0.0	15.20	125.00	0.09154

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	560.00	-0.00	6.30	4.40	72686.00	23.00	-0.00	-0.00	42.00	-0.00	-0.00
2	650.00	-0.00	5.60	6.60	25881.00	52.00	-0.00	-0.00	31.00	-0.00	-0.00
3	1110.00	-0.00	9.70	6.30	3585.00	62.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1110.00	-0.00	9.20	6.60	3865.00	100.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1132.00	-0.00	9.80	6.40	3473.00	67.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1289.00	-0.00	12.10	7.00	3361.00	32.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1256.00	-0.00	13.10	7.10	2913.00	17.00	-0.00	-0.00	14.00	-0.00	-0.00
8	1256.00	-0.00	12.10	7.20	2577.00	19.00	-0.00	-0.00	7.00	-0.00	-0.00
9	1121.00	-0.00	11.50	6.80	2801.00	19.00	-0.00	-0.00	6.00	-0.00	-0.00
10	751.00	-0.00	10.60	5.20	36973.00	8.00	-0.00	-0.00	31.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	708.32	468.04	0.0	777.28	0.42	0.42	12466.39	8237.51	0.0	13680.16	7.48	7.48
2	765.03	202.50	0.0	1416.68	1.17	1.17	16142.09	4272.66	0.0	29891.91	24.62	24.62
3	1197.93	25.36	0.0	1222.47	1.26	1.26	67443.19	1427.58	0.0	68824.81	70.81	70.81
4	1148.25	27.63	0.0	1294.29	2.05	2.05	64646.50	1555.43	0.0	72868.44	115.42	115.42
5	1196.47	24.28	0.0	1227.70	1.34	1.34	67361.06	1367.20	0.0	69119.56	75.64	75.64
6	1257.70	20.01	0.0	1143.22	0.55	0.55	176833.06	2813.14	0.0	160736.50	76.82	76.82
7	1291.53	16.45	0.0	1099.84	0.28	0.28	143747.06	1830.68	0.0	122412.06	30.64	30.64
8	1249.88	15.25	0.0	1168.57	0.32	0.32	120113.75	1465.10	0.0	112299.50	30.98	30.98
9	1250.41	17.44	0.0	1161.72	0.34	0.34	79150.69	1104.12	0.0	73536.69	21.48	21.48
10	1098.33	219.41	0.0	846.58	0.14	0.14	16694.61	3335.04	0.0	12868.04	2.07	2.07

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	21.10	4.22	765.03	16142.09	3.228	202.50	4272.66	0.855	1.17	24.62	0.0049
6	0.30	140.60	0.70	1257.70	176833.06	0.884	20.01	2813.14	0.014	0.55	76.82	0.0004
7	5.00	111.30	9.24	1291.53	143747.06	11.931	16.45	1830.68	0.152	0.28	30.64	0.0025
9	6.00	63.30	6.33	1250.41	79150.69	7.915	17.44	1104.12	0.110	0.34	21.48	0.0021
10	4.00	15.20	1.02	1098.33	16694.61	1.119	219.41	3335.04	0.223	0.14	2.07	0.0001
TOTAL FOR CYCLE			21.509			25.077			1.354			0.0101
TOTAL FOR CYCLE/LB FUEL						1.166			0.063			0.0005

DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 247 ENGINE TYPE AND MODEL: IO-540-C4B5 SERIAL NUMBER: L-6239-48A

RATED HORSEPOWER: 250.

ENGINE TOTAL TIME: 1760. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 65.00 FINISH 70.00

ATMOSPHERIC PRESSURE: START 29.80 FINISH 29.80

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 95.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	19.30	185.00	0.08243
IDLE/TAXI		2	-0.0	22.90	280.00	0.06929
RUN UP		3	-0.0	61.50	678.00	0.07936
RUN UP-LEAN		4	-0.0	61.50	677.00	0.07887
RUN UP-RICH		5	-0.0	59.80	655.00	0.07884
TAKE-OFF		6	-0.0	149.40	1635.00	0.08874
CLIMB		7	-0.0	109.00	1200.00	0.08244
DESCENT		8	-0.0	96.70	1062.00	0.08201
APPROACH		9	-0.0	52.70	579.00	0.07758
TAXI		10	-0.0	22.90	252.00	0.07748

0005

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO x (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	852.00	-0.00	9.50	6.20	19435.00	8.00	-0.00	-0.00	8.00	-0.00	-0.00
2	830.00	-0.00	6.00	8.70	3184.00	52.00	-0.00	-0.00	10.00	-0.00	-0.00
3	1267.00	-0.00	9.50	7.30	2690.00	75.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1233.00	-0.00	9.50	7.20	2580.00	66.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1390.00	-0.00	9.60	7.10	2416.00	54.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1446.00	-0.00	10.90	8.00	2361.00	56.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1412.00	-0.00	9.90	7.60	2525.00	65.00	-0.00	-0.00	9.00	-0.00	-0.00
8	1345.00	-0.00	9.90	7.50	2525.00	65.00	-0.00	-0.00	7.00	-0.00	-0.00
9	1199.00	-0.00	9.30	7.10	2745.00	55.00	-0.00	-0.00	13.00	-0.00	-0.00
10	807.00	-0.00	8.70	7.10	8564.00	36.00	-0.00	-0.00	8.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	1087.78	127.45	0.0	1115.44	0.15	0.15	20994.13	2459.82	0.0	21528.01	2.90	2.90
2	807.10	24.53	0.0	1838.81	1.15	1.15	18482.66	561.74	0.0	42108.63	26.31	26.31
3	1124.39	18.23	0.0	1357.55	1.46	1.46	69150.00	1121.41	0.0	83489.13	89.67	89.67
4	1131.75	17.60	0.0	1347.72	1.29	1.29	69602.69	1082.60	0.0	82884.44	79.43	79.43
5	1144.77	16.50	0.0	1330.28	1.06	1.06	68457.25	986.71	0.0	79550.88	63.25	63.25
6	1150.73	14.28	0.0	1327.02	0.97	0.97	171919.56	2132.75	0.0	198256.31	145.08	145.08
7	1126.62	16.46	0.0	1358.92	1.21	1.21	122801.56	1793.80	0.0	148122.25	132.43	132.43
8	1133.00	16.55	0.0	1348.64	1.22	1.22	109561.25	1600.40	0.0	130413.06	118.16	118.16
9	1126.76	19.05	0.0	1351.59	1.09	1.09	59380.32	1003.80	0.0	71228.88	57.68	57.68
10	1055.21	59.49	0.0	1353.06	0.72	0.72	24164.35	1362.32	0.0	30985.06	16.42	16.42

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	22.90	4.58	807.10	18482.66	3.697	24.53	561.74	0.112	1.15	26.31	0.0053
6	0.30	149.40	0.75	1150.73	171919.56	0.860	14.28	2132.75	0.011	0.97	145.08	0.0007
7	5.00	109.00	9.05	1126.62	122801.56	10.193	16.46	1793.80	0.149	1.21	132.43	0.0110
9	6.00	52.70	5.27	1126.76	59380.32	5.938	19.05	1003.80	0.100	1.09	57.68	0.0058
10	4.00	22.90	1.53	1055.21	24164.35	1.619	59.49	1362.32	0.091	0.72	16.42	0.0011
TOTAL FOR CYCLE			21.178			22.306			0.464			0.0238
TOTAL FOR CYCLE/LB FUEL						1.053			0.022			0.0011

DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 248 ENGINE TYPE AND MODEL: IO-540-C4B5 SERIAL NUMBER: L-6239-48

RATED HORSEPOWER: 250.

ENGINE TOTAL TIME: 1761. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 71.00 FINISH 71.00

ATMOSPHERIC PRESSURE: START 29.80 FINISH 29.80

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 84.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	24.60	235.00	0.07321
IDLE/TAXI		2	-0.0	24.60	269.00	0.06754
RUN UP		3	-0.0	59.80	653.00	0.07587
RUN UP-LEAN		4	-0.0	61.50	675.00	0.07488
RUN UP-RICH		5	-0.0	58.00	651.00	0.C8010
TAKE-OFF		6	-0.0	133.60	1459.00	0.08488
CLIMB		7	-0.0	105.50	1157.00	0.08111
DESCENT		8	-0.0	96.70	1056.00	0.07936
APPROACH		9	-0.0	58.00	636.00	0.07705
TAXI		10	-0.0	22.90	221.00	0.07707

0007

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO_2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO_2 (DRY) PPMV	NO_x (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	673.00	-0.00	5.80	6.70	32281.00	32.00	-0.00	-0.00	18.00	-0.00	-0.00
2	773.00	-0.00	5.80	7.30	14494.00	58.00	-0.00	-0.00	14.00	-0.00	-0.00
3	1300.00	-0.00	9.20	6.80	2855.00	86.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1233.00	-0.00	9.00	6.80	2745.00	58.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1368.00	-0.00	9.20	7.80	2690.00	57.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1368.00	-0.00	10.40	7.60	2745.00	58.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1356.00	-0.00	9.80	7.40	2525.00	68.00	-0.00	-0.00	8.00	-0.00	-0.00
8	1334.00	-0.00	9.70	7.10	2525.00	62.00	-0.00	-0.00	6.00	-0.00	-0.00
9	1222.00	-0.00	9.30	7.00	2525.00	56.00	-0.00	-0.00	6.00	-0.00	-0.00
10	807.00	-0.00	7.80	6.40	23223.00	58.00	-C.00	-0.00	14.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	745.00	237.48	0.0	1352.19	0.68	0.68	18326.87	5841.88	0.0	33263.93	16.61	16.61
2	805.35	115.26	0.0	1592.64	1.32	1.32	19811.60	2835.47	0.0	39178.92	32.54	32.54
3	1141.27	20.78	0.0	1325.40	1.75	1.75	68247.94	1212.98	0.0	79259.00	104.79	104.79
4	1131.12	19.76	0.0	1342.80	1.20	1.20	69563.56	1215.14	0.0	82582.19	73.64	73.64
5	1076.27	18.02	0.0	1433.73	1.10	1.10	62423.84	1045.35	0.0	83156.31	63.53	63.53
6	1149.71	17.38	0.0	1320.10	1.05	1.05	153601.69	2321.94	0.0	176365.88	140.71	140.71
7	1134.41	16.74	0.0	1345.90	1.29	1.29	119580.31	1766.05	0.0	141992.81	136.4C	136.40
8	1149.17	17.13	0.0	1321.63	1.21	1.21	111125.00	1656.71	0.0	127801.69	116.67	116.67
9	1135.07	17.65	0.0	1342.38	1.12	1.12	65833.81	1023.70	0.0	77857.88	65.11	65.11
10	953.73	162.63	0.0	1229.56	1.16	1.16	21840.42	3724.18	0.0	28156.90	26.68	26.68

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	24.60	4.92	805.35	19811.60	3.962	115.26	2835.47	0.567	1.32	32.54	0.0065
6	0.30	133.60	0.67	1149.71	153601.69	0.769	17.38	2321.94	0.012	1.05	140.71	0.0007
7	5.00	105.50	8.76	1134.41	119680.31	9.933	16.74	1766.05	0.147	1.29	136.4C	0.0113
9	6.00	58.00	5.80	1135.07	65833.81	6.583	17.65	1023.70	0.102	1.12	65.11	0.0065
10	4.00	22.90	1.53	953.73	21840.42	1.463	162.63	3724.18	0.250	1.16	26.68	0.0018
TOTAL FOR CYCLE			21.679			22.710			1.077			0.0268
TOTAL FOR CYCLE/LB FUEL						1.048			0.050			0.0012

DATE: 7/28/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA ••

CAL ID NUMBER: 249 ENGINE TYPE AND MODEL: IO-540-C4B5 SERIAL NUMBER: L-6239-48C

RATED HORSEPOWER: 250.

ENGINE TOTAL TIME: 1761. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA ••

INLET AIR TEMPERATURE, DEGREES F: START 71.00 FINISH 71.00

ATMOSPHERIC PRESSURE: START 29.73 FINISH 29.73

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RELATIVE HUMIDITY: 98.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	24.60	227.00	0.08154
IDLE/TAXI		2	-0.0	26.40	315.00	0.C6984
RUN UP		3	-0.0	61.50	659.00	0.08068
RUN UP-LEAN		4	-0.0	59.80	644.00	0.08102
RUN UP-RICH		5	-0.0	59.80	643.00	0.08125
TAKE-OFF		6	-0.0	124.80	1334.00	0.09270
CLIMB		7	-0.0	109.00	1173.00	0.08709
DESCENT		8	-0.0	98.40	1061.00	0.08486
APPROACH		9	-0.0	61.50	662.00	0.08002
TAXI		10	-0.0	24.60	239.00	0.07935

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	673.00	-0.00	8.30	6.20	29613.00	14.00	-0.00	-0.00	25.00	-0.00	-0.00
2	762.00	-0.00	6.40	8.10	5934.00	47.00	-0.00	-0.00	14.00	-0.00	-0.00
3	1300.00	-0.00	10.10	6.80	4104.00	70.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1211.00	-0.00	10.10	7.00	2995.00	83.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1323.00	-0.00	9.90	6.90	6433.00	55.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1368.00	-0.00	11.90	7.80	2662.00	47.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1356.00	-0.00	11.00	7.50	2385.00	54.00	-0.00	-0.00	9.00	-0.00	-0.00
8	1334.00	-0.00	10.70	7.30	2440.00	54.00	-0.00	-0.00	9.00	-0.00	-0.00
9	1211.00	-0.00	10.00	6.90	2773.00	52.00	-0.00	-0.00	9.00	-0.00	-0.00
10	785.00	-0.00	8.70	6.30	19964.00	37.00	-0.00	-0.00	17.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	960.29	196.22	0.0	1127.08	0.27	0.27	23623.17	4827.12	0.0	27726.18	6.54	6.54
2	856.63	45.49	0.0	1703.48	1.03	1.03	22615.09	1200.91	0.0	44971.97	27.28	27.28
3	1178.74	27.43	0.0	1246.93	1.34	1.34	72492.19	1687.03	0.0	76686.13	82.53	82.53
4	1172.70	19.92	0.0	1277.03	1.58	1.58	70127.31	1190.99	0.0	76366.38	94.66	94.66
5	1146.59	42.67	0.0	1255.63	1.05	1.05	68566.06	2551.72	0.0	75086.38	62.57	62.57
6	1204.08	15.43	0.0	1240.05	0.78	0.78	150268.63	1925.20	0.0	154758.31	97.49	97.49
7	1185.93	14.73	0.0	1270.48	0.96	0.96	129266.56	1605.19	0.0	138481.88	104.23	104.23
8	1184.86	15.47	0.0	1270.11	0.98	0.98	116589.75	1522.69	0.0	124979.13	96.65	96.65
9	1176.11	18.68	0.0	1275.07	1.00	1.00	72330.63	1148.73	0.0	78416.81	61.78	61.78
10	1034.10	135.91	0.0	1176.59	0.72	0.72	25438.93	3343.28	0.0	28944.00	17.77	17.77

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	26.40	5.28	856.63	22615.09	4.523	45.49	1200.91	0.240	1.03	27.28	0.0055
6	0.30	124.80	0.62	1204.08	150268.63	0.751	15.43	1925.20	0.010	0.78	97.49	0.0005
7	5.00	109.00	9.05	1185.93	129266.56	10.729	14.73	1605.19	0.133	0.96	104.23	0.0087
9	6.00	61.50	6.15	1176.11	72330.63	7.233	18.68	1148.73	0.115	1.00	61.78	0.0062
10	4.00	24.60	1.65	1034.10	25438.93	1.704	135.91	3343.28	0.224	0.72	17.77	0.0012
TOTAL FOR CYCLE			22.749			24.941			0.722			0.0220
TOTAL FOR CYCLE/LB FUEL						1.096			0.032			0.0010

DATE: 8/ 6/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 266 ENGINE TYPE AND MODEL: IO-540-C4B5 SERIAL NUMBER: L-1623-48

RATED HORSEPOWER: 250.

ENGINE TOTAL TIME: 1305. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 84.00 FINISH 84.00

ATMOSPHERIC PRESSURE: START 29.89 FINISH 29.89

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 51.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 9

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	3.50	26.00	0.08784
IDLE/TAXI		2	-0.0	15.80	142.00	0.08315
RUN UP		3	-0.0	31.60	306.00	0.08863
RUN UP-LEAN		4	-0.0	29.90	276.00	0.09003
RUN UP-RICH		5	-0.0	29.90	292.00	0.08854
TAKE-OFF		6	-0.0	109.00	1047.00	0.09541
CLIMB		7	-0.0	49.20	477.00	0.09078
APPROACH		9	-0.0	26.40	256.00	0.08978
TAXI		10	-0.0	12.30	121.00	0.07770

TEST MODE	EXHAUST GAS TFMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	650.00	-0.00	8.50	4.60	55732.00	13.00	-0.00	-0.00	58.00	-0.00	-0.00
2	762.00	-0.00	8.80	5.90	30777.00	28.00	-0.00	-0.00	60.00	-0.00	-0.00
3	1166.00	-0.00	12.90	5.40	5767.00	9.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1289.00	-0.00	12.20	5.60	13975.00	12.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1278.00	-0.00	12.70	5.60	5767.00	7.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1289.00	-0.00	14.20	5.70	4381.00	16.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1244.00	-0.00	13.30	5.60	4492.00	12.00	-0.00	-0.00	27.00	-0.00	-0.00
9	1121.00	-0.00	13.00	5.60	5379.00	11.00	-0.00	-0.00	14.00	-0.00	-0.00
10	818.00	-0.00	10.90	5.00	6322.00	11.00	-0.00	-0.00	41.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	919.61	345.33	0.0	781.95	0.23	0.23	3218.63	1208.65	0.0	2736.83	0.81	0.81
2	1000.02	200.31	0.0	1053.46	0.52	0.52	15800.33	3164.86	0.0	16644.61	8.26	8.26
3	1380.59	35.35	0.0	908.05	0.16	0.16	43626.71	1117.01	0.0	28694.24	5.00	5.00
4	1283.86	84.23	0.0	925.94	0.21	0.21	38387.34	2518.40	0.0	27685.65	6.20	6.20
5	1359.19	35.35	0.0	941.68	0.12	0.12	40639.71	1056.92	0.0	28156.14	3.68	3.68
6	1410.52	24.92	0.0	889.62	0.26	0.26	153746.94	2716.67	0.0	96968.56	28.45	28.45
7	1388.64	26.86	0.0	918.68	0.21	0.21	68321.19	1321.57	0.0	45199.16	10.13	10.13
9	1372.31	32.52	0.0	928.82	0.19	0.19	36228.86	858.53	0.0	24520.96	5.04	5.04
10	1331.98	44.25	0.0	960.02	0.22	0.22	16383.33	544.22	0.0	11808.22	2.72	2.72

LTO CYCLE EMISSIONS

TFST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	15.80	3.16	1000.02	15800.33	3.160	200.31	3164.86	0.633	0.52	8.26	0.0017
6	0.30	109.00	0.54	1410.52	153746.94	0.769	24.92	2716.67	0.014	0.26	28.45	0.0001
7	5.00	49.20	4.08	1388.64	68321.19	5.671	26.86	1321.57	0.110	0.21	10.13	0.0008
9	6.00	26.40	2.64	1372.31	36228.86	3.623	32.52	858.53	0.086	0.19	5.04	0.0005
10	4.00	12.30	0.82	1331.98	16383.33	1.098	44.25	544.22	0.036	0.22	2.72	0.0002
TOTAL FOR CYCLE			11.253			14.320			0.879			0.0033
TOTAL FOR CYCLF/LB FUEL						1.273			0.078			0.0003

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DATE:   8/ 6/71
TEST ORGANIZATION:  SCOTT/GEN AVIATION
ENGINE SUPPLIER:  LYCOMING
ENGINE DATA ***********************************************************************************************
     CAL ID NUMBER:  267    ENGINE TYPE AND MODEL:  IO-540-C4B5           SERIAL NUMBER:   L-1623-48C
                            RATED HORSEPOWER:   250.
     ENGINE TOTAL TIME:   1218. HRS
     FUEL: AV GAS 100/130          FUEL H/C RATIO:    1.840
OPERATIONAL DATA *******************************************************************************************
     INLET AIR TEMPERATURE, DEGREES F:  START   82.00   FINISH   82.00
     ATMOSPHERIC PRESSURE:              START   29.90   FINISH   29.90
     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01
     RELATIVE HUMIDITY:                     52.00  PERCENT
     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00
     SAMPLE LINE TRANSPORT TIME, SEC:    1.60
NUMBER OF TESTS:  10
COMMENTS:


                   CARB.    TEST      ENGINE       MEASURED        MEASURED       CALCULATED
                   HEATER   MODE       RPM        FUEL FLOW        AIR FLOW          F/A
                                                    LB/HR           LB/HR

IDLE-LOW                      1        -0.0          8.89           61.00         0.09052
IDLE/TAXI                     2        -0.0          8.80           74.00         0.08654
RUN UP                        3        -0.0         29.90          289.00         0.09284
RUN UP-LEAN                   4        -0.0         22.90          193.00         0.09070
RUN UP-RICH                   5        -0.0         28.10          275.00         0.09079
TAKE-OFF                      6        -0.0         72.10          700.00         0.10011
CLIMB                         7        -0.0         52.70          509.00         0.09415
DESCENT                       8        -0.0         40.40          393.C0         0.09225
APPROACH                      9        -0.0         26.40          255.00         0.09043
TAXI                         10        -0.0         10.50           81.00         0.09424


  TEST   EXHAUST    EXHAUST      CO         CO        THC        NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
  MODE     GAS        GAS       (DRY)        2       (DRY)     (DRY)        2         X       (DRY)
          TEMP     PRESSURE  PERCENT V    (DRY)      PPMV      PPMV     (DRY)     (DRY)
        DEGREES F    PSIA               PERCENT V                        PPMV      PPMV

   1     594.00     -0.00       8.40      4.40   64260.00    26.00     -0.00     -0.00     70.00     -0.00      -0.00
   2     717.00     -0.00       8.90      5.60   39780.00    22.00     -0.00     -0.00     66.00     -0.00      -0.00
   3    1166.00     -0.00      13.50      5.60    6870.00    15.00     -0.00     -0.00     -0.00     -0.00      -0.00
   4    1199.00     -0.00      11.00      5.20   31140.00    15.00     -0.00     -0.00     -0.00     -0.00      -0.00
   5    1256.00     -0.00      13.00      5.70    6630.00     9.00     -0.00     -0.00     -0.00     -0.00      -0.00
   6    1278.00     -0.00      14.70      6.20    4830.00    16.00     -0.00     -0.00     26.00     -0.00      -0.00
   7    1244.00     -0.00      13.90      5.70    4710.00    11.00     -0.00     -0.00     18.00     -0.00      -0.00
   8    1211.00     -0.00      13.50      5.70    4710.00    12.00     -C.00     -0.00     15.00     -0.00      -0.00
   9    1099.00     -0.00      13.20      5.50    5670.00    10.00     -0.00     -0.00     42.00     -0.00      -0.00
  10     773.00     -0.00      10.70      4.70   46260.00     9.00     -0.00     -0.00


  TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE      CO         HC         NO2        CO2        NO         NOX         CO         HC         NO2        CO2        NO         NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1     882.66     386.72       0.0      726.45      0.45       0.45    7767.38    3403.15       0.0     6392.73      3.95       3.95
   2     973.05     249.09       0.0      962.00      0.40       0.40    8562.88    2192.00       0.0     8465.56      3.48       3.48
   3    1378.34      40.17       0.0      898.36      0.25       0.25   41212.29    1201.14       0.0    26860.42      7.52       7.52
   4    1150.60     186.55       0.0      854.62      0.26       0.26   26348.62    4271.98       0.0    19570.71      5.9C       5.90
   5    1356.35      39.62       0.0      934.42      0.15       0.15   38113.48    1113.25       0.0    26257.20      4.33       4.33
   6    1388.83      26.14       0.0      920.37      0.25       0.25  100134.94    1884.35       0.0    66358.75     17.90      17.90
   7    1399.10      27.15       0.0      901.46      0.18       0.18   73732.38    1430.90       0.0    47506.91      9.58       9.58
   8    1386.47      27.70       0.0      919.79      0.20       0.20   56013.27    1119.         0.0    37159.53      8.18       8.18
   9    1384.08      34.05       0.0      906.13      0.17       0.17   36539.71     898.92        .0    23921.72      4.55       4.55
  10    1079.42     267.28       0.0      744.98      0.15       0.15   11333.93    2906.39        .0     7822.27      1.57       1.57


                                                       LTO CYCLE EMISSIONS

  TEST   TIME IN   MEASURED     FUEL       CO          CO          CO         HC        HC        HC         NO        NO          NO
  MODE    MODE    FUEL FLOW     USED      LB/1K       LB/1K     EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K     EMISSION
          MIN.      LB/HR       LBS.     LB FUEL      HOURS       LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS       LBS.

   2      12.00      8.80       1.76      973.05     8562.88     1.713     249.09   2192.00     0.438      0.40      3.48     C.0007
   6       0.30     72.10       0.36     1388.83   100134.94     0.501      26.14   1884.35     0.009      0.25     17.90      .0001
   7       5.00     52.70       4.37     1399.10    73732.38     6.120      27.15   1430.90     0.119      0.18      9.58     0.0008
   9       6.00     26.40       2.64     1384.08    36539.71     3.654      34.05    898.92     0.090      0.17      4.55     0.0005
  10       4.00     10.50       0.70     1079.42    11333.93     0.759     267.28   2806.39     0.188      0.15      1.57     0.0001

TOTAL FOR CYCLE                 9.838                            12.746                         0.845                        0.0021

TOTAL FOR CYCLE/LB FUEL                                           1.296                         0.086                        0.0002
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0013

DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 372 ENGINE TYPE AND MODEL: O-540-A1B5 SERIAL NUMBER: L-3141-40

RATED HORSEPOWER: 250.

ENGINE TOTAL TIME: 1133. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 78.00 FINISH 78.00

ATMOSPHERIC PRESSURE: START 30.29 FINISH 30.29

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 43.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	22.90	244.00	0.07009
IDLE/TAXI		2	-0.0	26.40	307.00	0.07242
RUN UP		3	-0.0	59.80	702.00	0.07933
RUN UP-LEAN		4	-0.0	56.30	661.00	0.07918
RUN UP-RICH		5	-0.0	43.90	515.00	0.07867
TAKE-OFF		6	-0.0	109.00	1275.00	0.08028
CLIMB		7	-0.0	91.40	1100.00	0.07978
DESCENT		8	-0.0	75.60	956.00	0.07475
DESCENT	ON	8	-0.0	87.90	917.00	0.08614
APPROACH		9	-0.0	56.30	665.00	0.07747
TAXI		10	-0.0	26.40	306.00	0.07909

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	639.00	-0.00	6.40	7.10	15801.00	9.00	-0.00	-0.00	23.00	-0.00	-0.00
2	650.00	-0.00	7.10	7.80	7274.00	21.00	-0.00	-0.00	18.00	-0.00	-0.00
3	852.00	-0.00	8.10	8.80	2870.00	212.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	729.00	-0.00	8.10	8.80	2536.00	128.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	818.00	-0.00	8.10	8.70	2369.00	127.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1480.00	-0.00	8.30	8.80	2926.00	322.00	-0.00	-0.00	7.00	-0.00	-0.00
7	1480.00	-0.00	7.60	9.50	2425.00	350.00	-0.00	-0.00	9.00	-0.00	-0.00
8	1446.00	-0.00	5.90	10.20	2090.00	899.00	-0.00	-0.00	12.00	-0.00	-0.00
8	1300.00	-0.00	11.40	6.70	3651.00	155.00	-0.00	-0.00	3.00	-0.00	-0.00
9	1222.00	-0.00	7.70	8.80	2870.00	265.00	-0.00	-0.00	9.00	-0.00	-0.00
10	796.00	-0.00	7.80	8.40	9057.00	32.00	-0.00	-0.00			

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	857.39	121.23	0.0	1494.49	0.20	0.20	19634.18	2776.28	0.0	34223.89	4.54	4.54
2	917.85	53.86	0.0	1584.34	0.45	0.45	24231.32	1421.80	0.0	41826.50	11.77	11.77
3	952.11	19.32	0.0	1625.26	4.09	4.09	56936.13	1155.39	0.0	97190.44	244.77	244.77
4	953.96	17.11	0.0	1628.42	7.48	2.48	53708.11	963.05	0.0	91680.19	139.41	139.41
5	960.50	16.09	0.0	1620.95	2.47	2.47	42165.83	706.29	0.0	71159.50	108.59	108.59
6	964.09	19.47	0.0	1606.05	6.14	6.14	105085.25	2121.70	0.0	175059.00	669.64	669.64
7	885.33	16.18	0.0	1738.81	6.70	6.70	80918.81	1478.74	0.0	158927.13	612.10	612.10
8	730.05	14.83	0.0	1985.24	18.29	18.29	55252.01	1120.95	0.0	150084.00	1382.85	1382.85
8	1247.25	22.88	0.0	1151.76	2.79	2.79	109633.56	2010.93	0.0	101239.94	244.84	244.84
9	926.66	19.78	0.0	1663.99	5.24	5.24	52170.82	1113.69	0.0	93682.38	294.92	294.92
10	921.20	61.26	0.0	1558.76	0.62	0.62	24319.76	1617.31	0.0	41151.20	16.39	16.39

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	26.40	5.28	917.85	24231.32	4.846	53.86	1421.80	0.284	0.45	11.77	0.0024
6	0.30	109.00	0.54	964.09	105085.25	0.525	19.47	2121.70	0.011	6.14	669.64	0.0033
7	5.00	91.40	7.59	885.33	80918.81	6.716	16.18	1478.74	0.123	6.70	612.10	0.0508
9	6.00	56.30	5.63	926.66	52170.82	5.217	19.78	1113.69	0.111	5.24	294.92	0.0295
10	4.00	26.40	1.77	921.20	24319.76	1.629	61.26	1617.31	0.108	0.62	16.39	0.0011
TOTAL FOR CYCLE			20.810			18.934			0.637			0.0871
TOTAL FOR CYCLE/LB FUEL						0.910			0.031			0.0042

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DATE:   8/17/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ***************************************************************************************************

    CAL ID NUMBER:  373    ENGINE TYPE AND MODEL:  O-540-A1B5                SERIAL NUMBER:   L-3141-40A

                           RATED HORSEPOWER:   250.

    ENGINE TOTAL TIME:    1133. HRS

    FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA **********************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   86.50   FINISH   83.00

    ATMOSPHERIC PRESSURE:              START   30.29   FINISH   30.29

    INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

    RELATIVE HUMIDITY:                     36.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.0C,  FLOW RATE, LITERS/MIN:    7.00

    SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  11

 COMMENTS:



                      CARB.     TEST      ENGINE        MEASURED        MEASURED       CALCULATED
                      HEATER    MODE       RPM          FUEL FLOW       AIR FLOW          F/A
                                                          LB/HR           LB/HR

                                                                                       0.06411
IDLE-LOW                          1        -0.0          19.30           230.00        0.07458
IDLE/TAXI                         2        -0.0          26.40           313.00        0.07790
RUN UP                            3        -0.0          59.80           402.00        0.07944
RUN UP-LEAN                       4        -0.0          59.80           703.00        0.07848
RUN UP-RICH                       5        -0.0          40.40           477.00        0.08034
TAKE-OFF                          6        -0.0         110.80          1291.00        0.07218
CLIMB                             7        -0.0          84.40          1082.00        0.07425
DESCENT                           8        -0.0          65.00           812.00        0.08597
DESCENT               ON          8        -0.0          77.40           804.00        0.09150
APPROACH                          9        -0.0          58.00           548.00        0.07886
TAXI                             10        -0.0          26.40           305.00


 TEST  EXHAUST    EXHAUST       CO          CO        THC        NO         NO        NO      ALDEHYDES    SMOKE    PARTICULATES
 MODE    GAS        GAS        (DRY)         2       (DRY)      (DRY)        2         X        (DRY)
        TEMP     PRESSURE   PERCENT V    (DRY)       PPMV       PPMV      (DRY)     (DRY)
      DEGREES F    PSIA                PERCENT V                           PPMV      PPMV

                                                                                                                   -0.00
  1     -0.00       -0.00       4.20      8.50   11918.00      13.00     -0.00     -0.00      18.00      -0.00       -0.00
  2    706.00       -0.00       6.90      8.50    7449.00      25.00     -0.00     -0.00      10.00      -0.00       -0.00
  3    986.00       -0.00       7.90      8.60    3642.00     259.00     -0.00     -0.00      -0.00      -0.00       -0.00
  4    975.00       -0.00       8.00      8.90    3200.00     149.00     -0.00     -0.00      -0.00      -0.00       -0.00
  5    886.00       -0.00       7.90      8.80    3035.00     139.00     -0.00     -0.00      -0.00      -0.00       -0.00
  6   1457.00       -0.00       8.30      8.70    3973.00     283.00     -0.00     -0.00       4.00      -0.00       -0.00
  7   1480.00       -0.00       5.20     10.30    2593.00    2026.00     -0.00     -0.00       5.00      -0.00       -0.00
  8   1390.00       -0.00       6.10      9.80    2704.00     851.00     -0.00     -0.00      11.00      -0.00       -0.00
  8   1256.00       -0.00      11.40      6.60    4193.00     157.00     -0.00     -0.00       5.00      -0.00       -0.00
  9   1110.00       -0.00      13.70      5.10    6566.00      34.00     -0.00     -0.00       8.00      -0.00       -0.00
 10    796.00       -0.00       7.90      8.30    8497.00      35.00     -0.00     -0.00


 TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2        NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

                                                            0.31  11788.26   1915.79      0.0   37484.98      5.99      5.99
  1      610.79     99.26      0.0    1942.23     0.31      0.51  22793.93   1409.33      0.0   44119.20     13.57     13.57
  2      863.41     53.38      0.0    1671.18     0.51      5.10  56593.20   1494.25      0.0   96799.63    304.76    304.76
  3      946.38     24.99      0.0    1618.72     5.10      2.87  56125.43   1285.77      0.0   98106.50    171.70    171.70
  4      938.55     21.50      0.0    1640.58     2.87      2.71  37920.30    834.35      0.0   66369.06    109.59    109.59
  5      938.62     20.65      0.0    1642.80     2.71      5.40 106791.75   2927.68      0.0  175880.25    598.09    598.09
  6      963.82     26.42      0.0    1587.37     5.40     42.66  56261.37   1606.77      0.0  175098.50   3600.53   3600.53
  7      666.60     19.04      0.0    2074.63    42.66     17.46  49536.39   1257.61      0.0  125042.75   1135.13   1135.13
  8      762.10     19.35      0.0    1923.74    17.46      2.83  96777.44   2038.63      0.0   88034.25    218.92    218.92
  8     1250.36     26.34      0.0    1137.39     2.83      0.58  82505.69   2264.69      0.0   48258.27     33.63     33.63
  9     1422.51     39.05      0.0     832.04     0.58      0.68  24712.46   1522.30      0.0   40794.83     17.98     17.98
 10      936.08     57.66      0.0    1545.26     0.68


                                              LTO CYCLE EMISSIONS

 TEST   TIME IN   MEASURED    FUFL       CO         CO        CO         HC        HC        HC         NO        NO         NO
 MODE    MODE    FUEL FLOW    USED      LB/1K      LB/1K    EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION
         MIN.      LB/HR      LBS.     LB FUEL     HOURS     LBS.      LB FUEL    HOURS     LBS.      LB FUEL    HOURS      LBS.

                                        863.41   22793.93    4.559      53.38   1409.33    0.282       0.51      13.57    0.0027
  2     12.00      26.40      5.28      963.82  106791.75    0.534      26.42   2927.68    0.015       5.40     598.09    0.0030
  6      0.30     110.80      0.55      666.60   56261.37    4.670      19.04   1606.77    0.133      42.66    3600.53    0.2988
  7      5.00      84.40      7.01     1422.51   82505.69    8.251      39.05   2264.69    0.226       0.58      33.63    0.0034
  9      6.00      58.00      5.80      936.08   24712.46    1.656      57.66   1522.30    0.102       0.68      17.98    0.0012
 10      4.00      26.40      1.77
                                                                                          0.758                          0.3091
TOTAL FOR CYCLE               20.408                         19.669

                                                                                          0.037                          0.0151
TOTAL FOR CYCLE/LB FUEL                                       0.964
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DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 374 ENGINE TYPE AND MODEL: O-540-A1B5 SERIAL NUMBER: L-3141-40B

RATED HORSEPOWER: 250.

ENGINE TOTAL TIME: 1133. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 87.00 FINISH 85.00

ATMOSPHERIC PRESSURE: START 30.29 FINISH 30.29

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 38.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	22.90	229.00	0.06351
IDLE/TAXI		2	-0.0	24.60	299.00	0.07207
RUN UP		3	-0.0	58.00	684.00	0.07574
RUN UP-LEAN		4	-0.0	61.50	730.00	0.07636
RUN UP-RICH		5	-0.0	40.40	478.00	0.07548
TAKE-OFF		6	-0.0	114.30	1343.00	0.07837
CLIMB		7	-0.0	87.90	1075.00	0.07386
DESCENT		8	-0.0	75.90	954.00	0.07127
DESCENT	ON	8	-0.0	77.40	799.00	0.08297
APPROACH		9	-0.0	58.00	670.00	0.07594
TAXI		10	-0.0	26.40	303.00	0.07738

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	5.16	-0.00	3.60	9.60	6318.00	31.00	-0.00	-0.00	14.00	-0.00	-0.00
2	560.00	-0.00	6.20	8.80	6242.00	38.00	-0.00	-0.00	10.00	-0.00	-0.00
3	1076.00	-0.00	7.60	8.50	2897.00	301.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1121.00	-0.00	7.60	8.70	2400.00	213.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1121.00	-0.00	7.60	8.50	2345.00	194.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1300.00	-0.00	8.00	8.70	2731.00	368.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1188.00	-0.00	6.60	9.20	2400.00	669.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1244.00	-0.00	5.60	9.70	2179.00	1067.00	-0.00	-0.00	6.00	-0.00	-0.00
8	1031.00	-0.00	11.10	6.30	3559.00	238.00	-0.00	-0.00	13.00	-0.00	-0.00
9	1031.00	-0.00	8.10	8.00	2952.00	281.00	-0.00	-0.00	6.00	-0.00	-0.00
10	-0.00	-0.00	7.80	8.00	9076.00	63.00	-0.00	-0.00	9.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	525.81	52.85	0.0	2203.09	0.74	0.74	12040.95	1210.27	0.0	50450.79	17.03	17.03
2	801.57	46.37	0.0	1787.60	0.81	0.81	19718.55	1140.62	0.0	43974.84	19.85	19.85
3	936.79	20.45	0.0	1646.22	6.09	6.09	54334.09	1186.18	0.0	95480.75	353.46	353.46
4	928.28	16.79	0.0	1669.64	4.27	4.27	57089.34	1032.52	0.0	102683.00	262.81	262.81
5	939.96	16.61	0.0	1651.78	3.94	3.94	37974.39	671.07	0.0	66732.00	159.22	159.22
6	952.21	18.62	0.0	1627.04	7.19	7.19	108837.00	2127.91	0.0	185970.56	822.35	822.35
7	831.27	17.31	0.0	1820.64	13.84	13.84	73068.44	1521.75	0.0	160034.00	1216.56	1216.56
8	729.05	16.25	0.0	1984.17	22.82	22.82	55334.80	1233.14	0.0	150598.44	1731.79	1731.79
8	1262.94	23.19	0.0	1126.26	4.45	4.45	97751.31	1795.04	0.0	87172.31	344.27	344.27
9	998.09	20.83	0.0	1548.86	5.69	5.69	57889.28	1208.30	0.0	89834.13	329.87	329.87
10	943.15	62.85	0.0	1519.90	1.25	1.25	24899.25	1659.32	0.0	40125.44	33.03	33.03

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	24.60	4.92	801.57	19718.55	3.944	46.37	1140.62	0.228	0.81	19.85	0.0040
6	0.30	114.30	0.57	952.21	108837.00	0.544	18.62	2127.91	0.011	7.19	822.35	0.0041
7	5.00	87.90	7.30	831.27	73068.44	6.065	17.31	1521.75	0.126	13.84	1216.56	0.1010
9	6.00	58.00	5.80	998.09	57889.28	5.789	20.83	1208.30	0.121	5.69	329.87	0.0330
10	4.00	26.40	1.77	943.15	24899.25	1.668	62.85	1659.32	0.111	1.25	33.03	0.0022
TOTAL FOR CYCLE			20.356			18.010			0.597			0.1443
TOTAL FOR CYCLE/LB FUEL						0.885			0.029			0.0071

DATE: 8/17/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 375 ENGINE TYPE AND MODEL: O-540-A1B5 SERIAL NUMBER: L-3454-40

RATED HORSEPOWER: 250.

ENGINE TOTAL TIME: 932. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 70.00 FINISH 74.00

ATMOSPHERIC PRESSURE: START 30.28 FINISH 30.28

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 57.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINF TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 11

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLE-LOW		1	-0.0	21.10	224.00	0.08193
IDLE/TAXI		2	-0.0	24.60	289.00	0.07488
RUN UP		3	-0.0	52.70	641.00	0.07996
RUN UP-LEAN		4	-0.0	47.50	587.00	0.07786
RUN UP-RICH		5	-0.0	52.70	654.00	0.07856
TAKE-OFF		6	-0.0	110.80	1207.00	0.09862
CLIMB		7	-0.0	110.80	1279.00	0.08521
DESCENT		8	-0.0	77.40	1032.00	0.07583
DESCENT	ON	8	-0.0	84.40	828.00	0.09400
APPROACH		9	-0.0	58.00	70.00	0.08091
TAXI		10	-0.0	22.90	271.00	0.07601

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	706.00	-0.00	6.20	8.90	26715.00	15.00	-0.00	-0.00	14.00	-0.00	-0.00
2	773.00	-0.00	5.70	9.40	11819.00	38.00	-0.00	-0.00	10.00	-0.00	-0.00
3	1278.00	-0.00	7.10	9.70	5991.00	209.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1334.00	-0.00	6.50	10.00	4695.00	152.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1312.00	-0.00	6.50	10.20	4372.00	109.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1379.00	-0.00	10.80	9.60	10200.00	276.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1424.00	-0.00	8.90	8.90	6638.00	171.00	-0.00	-0.00	4.00	-0.00	-0.00
8	1558.00	-0.00	4.20	12.00	4857.00	1356.00	-0.00	-0.00	7.00	-0.00	-0.00
8	1278.00	-0.00	12.30	6.80	10524.00	117.00	-0.00	-0.00	7.00	-0.00	-0.00
9	1614.00	-0.00	7.30	9.60	6962.00	247.00	-0.00	-0.00	6.00	-0.00	-0.00
10	1323.00	-0.00	5.70	9.70	11496.00	46.00	-0.00	-0.00	9.00	-0.00	-0.00

TEST MODE	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
1	704.81	173.93	0.0	1589.67	0.28	0.28	14871.39	3669.95	0.0	33541.95	5.91	5.91
2	707.25	83.99	0.0	1832.58	0.77	0.77	17398.28	2066.13	0.0	45081.43	19.05	19.05
3	824.39	39.84	0.0	1769.64	3.99	3.99	43445.42	2099.57	0.0	93260.06	210.06	210.06
4	773.83	32.01	0.0	1870.56	2.97	2.97	36756.97	1520.57	0.0	88851.44	141.19	141.19
5	766.26	29.52	0.0	1889.30	2.11	2.11	40381.82	1555.60	0.0	99565.94	111.23	111.23
6	1018.61	55.10	0.0	1422.63	4.28	4.28	112861.63	6104.75	0.0	157627.44	473.75	473.75
7	973.80	41.60	0.0	1530.06	3.07	3.07	107897.25	4608.96	0.0	169530.75	340.52	340.52
8	508.52	33.68	0.0	2282.85	26.97	26.97	39359.30	2606.82	0.0	176692.31	2087.27	2087.27
8	1233.05	60.42	0.0	1071.08	1.93	1.93	104069.25	5099.69	0.0	90399.25	162.60	162.60
9	838.12	45.78	0.0	1731.78	4.66	4.66	48610.91	2655.16	0.0	100443.13	270.16	270.16
10	695.81	80.37	0.0	1860.48	0.92	0.92	15933.98	1840.52	0.0	42604.90	21.12	21.12

LTO CYCLE EMISSIONS

TEST MODE	TIME IN MODE MIN.	MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	12.00	24.60	4.92	707.25	17398.28	3.480	83.99	2066.13	0.413	0.77	19.05	0.0038
6	0.30	110.80	0.55	1018.61	112861.63	0.564	55.10	6104.75	0.031	4.28	473.75	0.0024
7	5.00	110.80	9.20	973.80	107897.25	8.955	41.60	4608.96	0.383	3.07	340.52	0.0283
9	6.00	58.00	5.80	838.12	48610.91	4.861	45.78	2655.16	0.266	4.66	270.16	0.0270
10	4.00	22.90	1.53	695.81	15933.98	1.068	80.37	1840.52	0.123	0.92	21.12	0.0014
TOTAL FOR CYCLE			22.005			18.928			1.215			0.0629
TOTAL FOR CYCLE/LB FUEL						0.860			0.055			0.0029

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DATE:   8/17/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ******************************************************************************************

     CAL ID NUMBER:  376    ENGINE TYPE AND MODEL:  O-540-A1B5                SERIAL NUMBER:   L-3454-40A

                            RATED HORSEPOWER:   250.

     ENGINE TOTAL TIME:    932. HRS

     FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840

OPERATIONAL DATA *************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   75.50   FINISH   78.50

     ATMOSPHERIC PRESSURE:              START   30.28   FINISH   30.28

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     50.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  11

COMMENTS:



                   CARB.    TEST     ENGINE      MEASURED      MEASURED      CALCULATED
                   HEATER   MODE      RPM        FUEL FLOW     AIR FLOW         F/A
                                                  LB/HR         LB/HR

IDLE-LOW                     1        -0.0        22.90         279.00        0.05483
IDLE/TAXI                    2        -0.0        22.90         295.00        0.06929
RUN UP                       3        -0.0        52.70         640.00        0.08065
RUN UP-LEAN                  4        -0.0        47.50         580.00        0.07936
RUN UP-RICH                  5        -0.0        52.70         487.00        0.06696
TAKE-OFF                     6        -0.0       109.00        1262.00        0.08615
CLIMB                        7        -0.0        80.90        1067.00        0.07564
DESCENT                      8        -0.0        70.30         935.00        0.07521
DESCENT             ON       8        -0.0        72.10         741.00        0.08989
APPROACH                     9        -0.0        52.70         625.00        0.07979
TAXI                        10        -0.0        24.60         312.00        0.07022


 TEST   EXHAUST    EXHAUST      CO          CO         THC        NO        NO        NO     ALDEHYDES   SMOKE    PARTICULATES
 MODE    GAS        GAS        (DRY)         2        (DRY)      (DRY)       2         X       (DRY)
         TEMP     PRESSURE   PERCENT V    (DRY)       PPMV       PPMV      (DRY)     (DRY)
       DEGREES F    PSIA                PERCENT V                          PPMV      PPMV

  1     493.00     -0.00       2.10       8.30  14808.00      18.00     -0.00     -0.00     11.00     -0.00       -0.00
  2     684.00     -0.00       4.60      10.10   4177.00      42.00     -0.00     -0.00      7.00     -0.00       -0.00
  3    1233.00     -0.00       7.50       9.80   2549.00     193.00     -0.00     -0.00     -0.00     -0.00       -0.00
  4    1267.00     -0.00       7.20       9.90   1844.00     145.00     -0.00     -0.00     -0.00     -0.00       -0.00
  5    1099.00     -0.00       3.50       6.70  41984.00      87.00     -0.00     -0.00     -0.00     -0.00       -0.00
  6    1278.00     -0.00       9.30       9.20   1898.00     208.00     -0.00     -0.00     -0.00     -0.00       -0.00
  7    1076.00     -0.00       4.80      11.70   1193.00    1076.00     -0.00     -0.00      4.00     -0.00       -0.00
  8    1211.00     -0.00       4.50      11.90   1410.00    1184.00     -0.00     -0.00      9.00     -0.00       -0.00
  8    1143.00     -0.00      12.20       6.70   3634.00     117.00     -0.00     -0.00      5.00     -0.00       -0.00
  9    1166.00     -0.00       8.00       9.10   2115.00     222.00     -0.00     -0.00      4.00     -0.00       -0.00
 10     919.00     -0.00       5.20       9.70   3905.00      59.00     -0.00     -0.00      7.00     -0.00       -0.00


 TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

  1       357.09     144.21      0.0     2217.55       0.50       0.50    8177.31    3302.43      0.0    50781.77      11.51      11.51
  2       614.72      31.97      0.0     2120.68       0.92       0.92   14076.97     732.08      0.0    48563.63      21.11      21.11
  3       863.11      16.80      0.0     1772.02       3.65       3.65   45485.75     885.38      0.0    93385.25     192.26     192.26
  4       841.55      12.34      0.0     1818.11       2.78       2.78   39973.63     586.34      0.0    86360.38     132.23     132.23
  5       491.08     337.38      0.0     1477.07       2.01       2.01   25880.09   17779.80      0.0    77841.50     105.67     105.67
  6      1005.26      11.75      0.0     1562.51       3.69       3.69  109573.69    1280.75      0.0   170313.69     402.54     402.54
  7       583.49       8.31      0.0     2234.67      21.48      21.48   47203.95     671.93      0.0   180784.56    1738.08    1738.08
  8       549.61       9.86      0.0     2283.63      23.75      23.75   38637.39     693.36      0.0   160539.06    1665.81    1669.81
  8      1279.47      21.83      0.0     1104.03       2.02       2.02   92249.44    1573.74      0.0    79600.75     145.31     145.31
  9       933.59      14.14      0.0     1668.58       4.26       4.26   49200.30     744.96      0.0    87934.06     224.26     224.26
 10       687.04      29.55      0.0     2013.68       1.28       1.28   16901.23     726.91      0.0    49536.45      31.50      31.50


                                                      LTO CYCLE EMISSIONS

 TEST    TIME IN   MEASURED     FUEL        CO         CO          CO         HC         HC          HC         NO         NO         NO
 MODE     MODE     FUEL FLOW    USED      LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION    LB/1K      LB/1K    EMISSION
          MIN.      LB/HR       LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS        LBS.     LB FUEL     HOURS      LBS.

  2      12.00      22.90       4.58     614.72   14076.97      2.815      31.97     732.08      0.146       0.92      21.11    0.0042
  6       0.30     109.00       0.54    1005.26  109573.69      0.548      11.75    1280.75      0.006       3.69     402.54    0.0020
  7       5.00      80.90       6.71     583.49   47203.95      3.918       8.31     671.93      0.056      21.48    1738.08    0.1443
  9       6.00      52.70       5.27     933.59   49200.30      4.920      14.14     744.96      0.074       4.26     224.26    0.0224
 10       4.00      24.60       1.65     687.04   16901.23      1.132      29.55     726.91      0.049       1.28      31.50    0.0021

TOTAL FOR CYCLE                18.758                          13.334                           0.332                         0.1750

TOTAL FOR CYCLE/LB FUEL                                         0.711                           0.018                         0.0093
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DATE:   8/17/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  377    ENGINE TYPE AND MODEL:  O-540-A1B5               SERIAL NUMBER:   L-3454-40B

                            RATED HORSEPOWER:   250.

     ENGINE TOTAL TIME:     932. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    87.00   FINISH   84.00

     ATMOSPHERIC PRESSURE:              START    30.29   FINISH   30.29

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     38.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  11

 COMMENTS:



                    CARB.     TEST      ENGINE       MEASURED      MEASURED      CALCULATED
                    HEATER    MODE       RPM         FUEL FLOW     AIR FLOW         F/A
                                                      LB/HR         LB/HR

 IDLE-LOW                       1        -0.0          22.90        290.00        0.06703
 IDLE/TAXI                      2        -0.0          24.60        320.00        0.06482
 RUN UP                         3        -0.0          56.30        678.00        0.07688
 RUN UP-LEAN                    4        -0.0          49.20        596.00        0.07677
 RUN UP-RICH                    5        -0.0          52.70        479.00        0.06593
 TAKE-OFF                       6        -0.0         110.80       1388.00        0.07059
 CLIMB                          7        -0.0         109.00       1253.00        0.08091
 DESCENT                        8        -0.0          70.30        935.00        0.07172
 DESCENT                        8        -0.0          79.10        812.00        0.08647
 APPROACH                       9        -0.0          51.00        606.00        0.07793
 TAXI                          10        -0.0          29.90        401.00        0.06784


  TEST   EXHAUST    EXHAUST     CO         CO        THC        NO        NO        NO      ALDEHYDES     SMOKE      PARTICULATES
  MODE     GAS        GAS      (DRY)        2       (DRY)      (DRY)       2         X       (DRY)
          TEMP     PRESSURE  PERCENT V   (DRY)      PPMV       PPMV     (DRY)     (DRY)
        DEGREES F    PSIA               PERCENT V                        PPMV      PPMV

   1     639.00     -0.00       4.70       9.30   5742.00      34.00     -0.00     -0.00     10.00       -0.00         -0.00
   2     751.00     -0.00       4.20       9.60   3137.00      53.00     -0.00     -0.00      8.00       -0.00         -0.00
   3    1200.00     -0.00       7.30       9.20   1914.00     172.00     -0.00     -0.00     -0.00       -0.00         -0.00
   4    1233.00     -0.00       7.20       9.30   1755.00     138.00     -0.00     -0.00     -0.00       -0.00         -0.00
   5     953.00     -0.00       4.30       6.00  38281.00      59.00     -0.00     -0.00     -0.00       -0.00         -0.00
   6    1412.00     -0.00       5.80       9.40   1489.00     197.00     -0.00     -0.00     -0.00       -0.00         -0.00
   7    1323.00     -0.00       8.80       8.50   2020.00    1478.00     -0.00     -0.00      9.00       -0.00         -0.00
   8    1412.00     -0.00       4.30      11.30   1329.00    1232.00     -0.00     -0.00      5.00       -0.00         -0.00
   8    1233.00     -0.00      11.80       6.40   3084.00     131.00     -0.00     -0.00      5.00       -0.00         -0.00
   9    1166.00     -0.00       7.70       9.00   2020.00     182.00     -0.00     -0.00      5.00       -0.00         -0.00
  10     684.00     -0.00       3.70      10.90   2605.00      94.00     -0.00     -0.00      5.00       -0.00         -0.00


  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1      651.50     45.59      0.0    2025.53      0.77      0.77  14919.36   1043.90     0.0   46384.58     17.73     17.73
   2      601.19     25.72      0.0    2159.09      1.25      1.25  14789.21    632.64     0.0   53113.54     30.65     30.65
   3      883.55     13.27      0.0    1749.59      3.42      3.42  49743.94    746.97     0.0   98501.56    192.52    192.52
   4      872.28     12.18      0.0    1770.29      2.75      2.75  42916.12    599.12     0.0   87098.19    135.11    135.11
   5      614.87    313.51      0.0    1348.06      1.39      1.39  32403.87  16521.79     0.0   71042.50     73.03     73.03
   6      763.40     11.22      0.0    1943.97      4.26      4.26  84584.75   1243.67     0.0  215392.31    471.90    471.90
   7     1015.77     13.35      0.0    1541.60     28.02     28.02 110719.25   1455.58     0.0  168034.25   3054.47   3054.47
   8      552.16      9.77      0.0    2279.87     25.99     25.99  38816.51    687.10     0.0  160274.69   1826.75   1826.75
   8     1288.00     19.28      0.0    1097.62      2.35      2.35 101880.44   1524.99     0.0   86821.56    185.78    185.78
   9      920.35     13.83      0.0    1690.22      3.57      3.57  46937.99    705.23     0.0   86201.44    182.23    182.23
  10      503.00     20.28      0.0    2328.27      2.10      2.10  15039.77    606.45     0.0   69615.19     62.76     62.76


                                                      LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL       CO         CO         CO         HC        HC         HC        NO        NO        NO
  MODE     MODE    FUEL FLOW    USED      LB/1K      LB/1K    EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K   EMISSION
           MIN.      LB/HR      LBS.     LB FUEL     HOURS      LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.

   2      12.00      24.60      4.92      601.19   14789.21     2.958     25.72     632.64     0.127      1.25      30.65    0.0061
   6       0.30     110.80      0.55      763.40   84584.75     0.423     11.22    1243.67     0.006      4.26     471.90    0.0024
   7       5.00     109.00      9.05     1015.77  110719.25     9.190     13.35    1455.58     0.121     28.02    3054.47    0.2535
   9       6.00      51.00      5.10      920.35   46937.99     4.694     13.83     705.23     0.071      3.57     182.23    0.0182
  10       4.00      29.90      2.00      503.00   15039.77     1.008     20.28     606.45     0.041      2.10      62.76    0.0042

 TOTAL FOR CYCLE                21.624                         18.272                          0.365                          0.2844

 TOTAL FOR CYCLE/LB FUEL                                        0.845                          0.017                          0.0132
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SUMMARY 0 - 200A

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MODEL SUMMARY          SAMPLE NUMBER = 19.

TEST                    MEASURED    FUEL       CO          CO          CO        HC        HC         HC         NO        NO         NO
MODE                    FUEL FLOW   USED      LB/1K       LB/1K     EMISSION    LB/1K     LB/1K     EMISSION    LB/1K     LB/1K    EMISSION
                          LB/HR     LBS.     LB FUEL      HOURS       LBS.     LB FUEL    HOURS       LBS.     LB FUEL    HOURS      LBS.

  2          MEAN:         7.68     1.54     967.85      7519.03     1.504     27.07     213.94     0.0428     1.17       8.86     0.0018
          STD DEV:         1.34     0.27     136.25      2147.27     0.429     10.67     131.95     0.0264     0.38       3.03     0.0006

  6          MEAN:        48.41     0.24    1109.63     54600.71     0.273     14.67     719.60     0.0036     6.00     258.93     0.0013
          STD DEV:         4.24     0.02     232.11     12360.03     0.062      4.82     246.42     0.0012     8.56     265.29     0.0013

  7          MEAN:        48.41     4.02    1109.63     54600.71     4.532     14.67     719.60     0.0597     6.00     258.93     0.0215
          STD DEV:         4.24     0.35     232.11     12360.03     1.026      4.82     246.42     0.0205     8.56     265.29     0.0220

  9          MEAN:        21.29     2.13    1117.45     23841.52     2.384     17.86     379.68     0.0380     2.43      51.76     0.0052
          STD DEV:         1.21     0.12      61.01      2275.58     0.228      4.02      87.55     0.0088     1.34      29.77     0.0030

 10          MEAN:         6.49     0.44     998.81      6536.55     0.438     21.75     140.58     0.0094     [illegible].46       9.50     0.0006
          STD DEV:         1.07     0.07     114.70      1589.63     0.107      5.49      45.30     0.0030     0.47       3.46     0.0002

TOTAL FOR CYCLE          MEAN:    8.361                              9.131                          0.153                          0.0304
                      STD DEV:    0.639                              1.524                          0.048                          0.0239

TOTAL FOR CYCLE/LB FUEL                                   MEAN:      1.084                          0.018                          0.0038
                                                       STD DEV:      0.135                          0.005                          0.0038
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SUMMARY 0 - 320

```
MODEL SUMMARY          SAMPLE NUMBER = 28.

TEST                    MEASURED    FUEL       CO          CO          CO        HC        HC         HC         NO        NO         NO
MODE                    FUEL FLOW   USED      LB/1K       LB/1K     EMISSION    LB/1K     LB/1K     EMISSION    LB/1K     LB/1K    EMISSION
                          LB/HR     LBS.     LB FUEL      HOURS       LBS.     LB FUEL    HOURS       LBS.     LB FUEL    HOURS      LBS.

  2          MEAN:        12.99     2.60     835.02     11056.69     2.211     26.04     355.08     0.0710     1.03      12.53     0.0025
          STD DEV:         5.16     1.03     234.46      6014.22     1.203     12.38     247.99     0.0496     0.72      10.87     0.0022

  6          MEAN:        65.68     0.33    1075.71     70926.00     0.355     22.27    1490.02     0.0075     3.23     213.51     0.0011
          STD DEV:        10.73     0.05     156.55     16345.73     0.082     14.82    1094.05     0.0055     4.44     271.24     0.0014

  7          MEAN:        63.54     5.27    1022.85     65753.06     5.458     20.49    1309.65     0.1087     5.93     375.43     0.0312
          STD DEV:        10.95     0.91     247.90     21934.26     1.821     13.72     971.72     0.0807    12.77     839.61     0.0697

  9          MEAN:        23.13     2.31    1027.34     24266.00     2.427     20.93     495.80     0.0496     2.26      51.42     0.0051
          STD DEV:         8.59     0.86     124.59     10546.54     1.055      4.10     236.96     0.0237     1.52      50.03     0.0050

 10          MEAN:        13.48     0.90     714.86     10045.07     0.673     22.62     320.03     0.0214     1.59      21.92     0.0015
          STD DEV:         6.70     0.45     228.47      6281.34     0.421     13.05     283.00     0.0190     1.11      24.82     0.0017

TOTAL FOR CYCLE          MEAN:   11.415                             11.123                          0.258                          0.0413
                      STD DEV:    2.364                              2.916                          0.113                          0.0742

TOTAL FOR CYCLE/LB FUEL                                   MEAN:      0.970                          0.022                          0.0035
                                                       STD DEV:      0.131                          0.009                          0.0056
```

SUMMARY I0 - 360

```
MODEL SUMMARY          SAMPLE NUMBER = 15.

TEST                    MEASURED    FUEL       CO          CO          CO        HC        HC         HC         NO        NO         NO
MODE                    FUEL FLOW   USED      LB/1K       LB/1K     EMISSION    LB/1K     LB/1K     EMISSION    LB/1K     LB/1K    EMISSION
                          LB/HR     LBS.     LB FUEL      HOURS       LBS.     LB FUEL    HOURS       LBS.     LB FUEL    HOURS      LBS.

  2          MEAN:        15.87     3.17     848.18     13001.87     2.600    144.50    2259.32     0.4519     1.09      17.82     0.0036
          STD DEV:         4.76     0.95     272.92      5783.23     1.157    136.44    2774.19     0.5548     0.87      16.75     0.0033

  6          MEAN:        88.70     0.44    1031.25     92088.13     0.460     22.47    2034.49     0.0102     5.32     474.50     0.0024
          STD DEV:        18.42     0.09     133.90     24629.55     0.123      5.96     784.63     0.0039     4.97     486.96     0.0024

  7          MEAN:        67.88     5.63     971.97     67412.13     5.595     17.40    1196.83     0.0993     6.60     407.76     0.0338
          STD DEV:        13.79     1.14     210.70     23895.07     1.983      3.33     395.98     0.0329     6.11     339.78     0.0282

  9          MEAN:        33.51     3.35     980.66     34420.59     3.442     22.80     772.36     0.0772     4.74     141.54     0.0142
          STD DEV:         8.46     0.85     238.44     16140.19     1.614      6.03     313.61     0.0314     2.93      73.86     0.0074

 10          MEAN:        15.96     1.07     931.26     14212.80     0.952    182.26    2905.61     0.1947     0.86      13.57     0.0009
          STD DEV:         4.81     0.32     341.25      6210.09     0.416    126.99    2763.99     0.1852     0.71      12.34     0.0008

TOTAL FOR CYCLE          MEAN:   13.671                             13.050                          0.833                          0.0548
                      STD DEV:    2.441                              4.319                          0.764                          0.0356

TOTAL FOR CYCLE/LB FUEL                                   MEAN:      0.947                          0.059                          0.0042
                                                       STD DEV:      0.214                          0.043                          0.0029
```

SUMMARY I0 - 470

MODEL SUMMARY SAMPLE NUMBER = 12.

TEST MODE		MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	MEAN:	21.53	4.31	724.07	15383.41	3.077	101.89	2065.28	0.4131	0.95	20.87	0.0042
	STD DEV:	7.84	1.57	175.94	6843.84	1.369	76.02	1786.88	0.3574	0.96	24.30	0.0049
6	MEAN:	104.69	0.52	800.73	83614.44	0.418	30.88	3295.03	0.0165	6.86	712.99	0.0036
	STD DEV:	14.07	0.07	123.41	16579.38	0.083	11.09	1375.73	0.0069	4.31	477.38	0.0024
7	MEAN:	80.24	6.66	792.44	63485.63	5.269	18.10	1463.02	0.1214	5.90	467.62	0.0388
	STD DEV:	8.29	0.69	72.98	8136.49	0.675	7.76	683.24	0.0567	3.02	237.77	0.0197
9	MEAN:	53.97	5.40	965.91	52267.35	5.227	19.52	1058.83	0.1059	3.40	177.88	0.0178
	STD DEV:	9.13	0.91	42.75	9956.32	0.996	3.80	313.66	0.0314	1.35	69.10	0.0069
10	MEAN:	21.68	1.45	821.79	17858.19	1.196	188.31	3918.95	0.2626	0.64	14.97	0.0010
	STD DEV:	8.47	0.57	137.06	7698.01	0.516	93.89	2759.22	0.1849	0.36	10.66	0.0007
TOTAL FOR CYCLE	MEAN:		18.340			15.187			0.919			0.0653
	STD DEV:		3.511			3.215			0.560			0.0283
TOTAL FOR CYCLE/LB FUEL	MEAN:					0.830			0.049			0.0037
	STD DEV:					0.075			0.025			0.0016

SUMMARY 0 - 470

MODEL SUMMARY SAMPLE NUMBER = 2.

TEST MODE		MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	MEAN:	15.85	3.17	984.36	15696.43	3.139	54.03	887.93	0.1776	0.58	8.76	0.0018
	STD DEV:	1.20	0.24	156.96	3671.08	0.734	52.54	897.76	0.1796	0.62	9.09	0.0018
6	MEAN:	103.25	0.52	1012.71	104646.94	0.523	13.75	1416.04	0.0071	2.07	221.67	0.0011
	STD DEV:	7.85	0.04	21.52	10170.77	0.051	1.00	4.69	0.0000	1.95	217.91	0.0011
7	MEAN:	86.15	7.15	614.93	53209.41	4.416	7.77	660.81	0.0548	3.25	294.08	0.0244
	STD DEV:	21.00	1.74	22.19	14825.50	1.231	0.83	91.97	0.0076	1.36	184.98	0.0154
9	MEAN:	43.40	4.34	782.57	33909.88	3.391	8.83	382.50	0.0382	3.92	168.31	0.0168
	STD DEV:	1.98	0.20	54.15	801.44	0.080	0.77	15.90	0.0016	1.91	75.25	0.0075
10	MEAN:	14.10	0.94	974.76	14013.73	0.939	52.35	803.95	0.0539	0.38	4.90	0.0003
	STD DEV:	2.40	0.16	224.28	5505.84	0.369	54.79	898.36	0.0602	0.39	4.64	0.0003
TOTAL FOR CYCLE	MEAN:		16.121			12.409			0.332			0.0444
	STD DEV:		1.579			0.099			0.234			0.0110
TOTAL FOR CYCLE/LB FUEL	MEAN:					0.773			0.021			0.0027
	STD DEV:					0.070			0.017			0.0004

SUMMARY TSI0 - 520

MODEL SUMMARY SAMPLE NUMBER = 6.

TEST MODE		MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
2	MEAN:	27.85	5.57	602.78	17036.25	3.407	85.22	2196.34	0.4393	0.62	18.87	0.0038
	STD DEV:	6.90	1.38	275.60	6879.25	1.376	59.07	1229.66	0.2459	0.34	12.62	0.0025
6	MEAN:	121.60	0.61	464.11	57636.38	0.288	11.42	1402.19	0.0070	25.68	3030.31	0.0152
	STD DEV:	10.61	0.05	138.19	20831.44	0.104	1.83	322.62	0.0016	10.80	999.79	0.0050
7	MEAN:	104.90	8.71	774.84	83206.38	6.906	11.38	1711.74	0.1006	7.07	695.86	0.0578
	STD DEV:	12.42	1.03	194.84	28889.20	2.398	1.85	321.54	0.0267	5.18	423.85	0.0352
9	MEAN:	58.32	5.83	1043.90	60819.99	6.082	16.02	933.78	0.0934	2.03	119.05	0.0119
	STD DEV:	1.33	0.13	173.74	9832.53	0.983	2.41	136.28	0.0136	1.25	73.92	0.0074
10	MEAN:	29.28	1.96	910.84	26023.02	1.744	73.91	1860.05	0.1246	0.87	27.65	0.0019
	STD DEV:	10.36	0.69	77.37	7269.30	0.487	36.71	422.84	0.0283	0.30	17.44	0.0012
TOTAL FOR CYCLE	MEAN:		22.678			18.427			0.765			0.0904
	STD DEV:		1.230			2.650			0.277			0.0484
TOTAL FOR CYCLE/LB FUEL	MEAN:					0.817			0.034			0.0039
	STD DEV:					0.142			0.013			0.0020

SUMMARY I0 - 540

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MODEL SUMMARY          SAMPLE NUMBER =  7.

 TEST              MEASURED    FUEL      CO         CO          CO        HC        HC         HC        NO       NO       NO
 MODE              FUEL FLOW   USED     LB/1K      LB/1K     EMISSION    LB/1K     LB/1K     EMISSION    LB/1K    LB/1K   EMISSION
                    LB/HR      LBS.    LB FUEL     HOURS       LBS.     LB FUEL    HOURS       LBS.     LB FUEL   HOURS     LBS.

  2        MEAN:    19.60      3.92     892.19    17097.97     3.420     129.00    2198.03    0.4396      0.87     18.71   0.0037
       STD DEV:      6.05      1.21     109.31     4407.29     0.881      88.48    1316.39    0.2633      0.39     11.57   0.0023

  6        MEAN:   120.96      0.60    1250.01   149399.25     0.747      19.31    2256.04    0.0113      0.74     94.67   0.0005
       STD DEV:     25.54      0.13     108.73    25252.25     0.126       4.62     377.75    0.0019      0.41     56.36   0.0003

  7        MEAN:    91.74      7.61    1243.15   111656.88     9.268      19.69    1685.16    0.1399      0.74     76.88   0.0064
       STD DEV:     27.96      2.32     116.23    28862.23     2.396       5.19     249.79    0.0207      0.50     57.64   0.0048

  9        MEAN:    47.89      4.79    1226.35    57559.49     5.756      23.30    1021.38    0.1021      0.76     40.04   0.0040
       STD DEV:     15.67      1.57     111.85    16682.53     1.668       7.15     110.38    0.0110      0.51     28.42   0.0028

 10        MEAN:    18.00      1.21    1099.37    19424.22     1.301     153.39    2623.89    0.1758      0.47     10.06   0.0007
       STD DEV:      5.60      0.38     118.20     4951.68     0.332      81.07    1195.70    0.0801      0.40     10.11   0.0007

TOTAL FOR CYCLE          MEAN:  18.134                        20.491                           0.869                      0.0153
                      STD DEV:   5.339                         4.964                           0.283                      0.0100

TOTAL FOR CYCLE/LB FUEL                              MEAN:     1.153                           0.053                      0.0008
                                                  STD DEV:     0.099                           0.024                      0.0004
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SUMMARY 0 - 540

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MODEL SUMMARY          SAMPLE NUMBER =  6.

 TEST              MEASURED    FUEL      CO         CO          CO        HC        HC         HC        NO       NO       NO
 MODE              FUEL FLOW   USED     LB/1K      LB/1K     EMISSION    LB/1K     LB/1K     EMISSION    LB/1K    LB/1K   EMISSION
                    LB/HR      LBS.    LB FUEL     HOURS       LBS.     LB FUEL    HOURS       LBS.     LB FUEL   HOURS     LBS.

  2        MEAN:    24.92      4.98     751.00    18834.69     3.767      49.21    1233.[illegible]    0.2468      0.78     19.33   0.0039
       STD DEV:      1.32      0.26     131.12     4162.94     0.833      20.52     525.[illegible]    0.1051      0.79      6.67   0.0013

  6        MEAN:   110.78      0.55     944.56   104622.31     0.523      23.76    2634.41    0.0132      5.16    573.04   0.0029
       STD DEV:      1.94      0.01      92.53    10164.48     0.051      16.34    1811.92    0.0091      1.33    155.74   0.0008

  7        MEAN:    94.07      7.81     826.04    79344.81     6.586      19.30    1890.62    0.1569     19.30   1760.37   0.1461
       STD DEV:     12.77      1.06     170.66    26105.00     2.167      11.55    1374.78    0.1141     14.69   1316.45   0.1094

  9        MEAN:    55.67      5.57    1006.55    56219.13     5.622      25.57    1448.67    0.1449      4.00    227.51   0.0223
       STD DEV:      3.08      0.31     210.05    13442.22     1.344      13.52     817.24    0.0817      1.83    106.15   0.0106

 10        MEAN:    26.10      1.75     781.05    20301.05     1.360      52.00    1328.80    0.0890      1.14     30.46   0.0020
       STD DEV:      2.33      0.16     180.76     4797.29     0.321      22.59     524.57    0.0351      0.54     17.27   0.0012

TOTAL FOR CYCLE          MEAN:  20.660                        17.858                           0.651                      0.1771
                      STD DEV:   1.143                         2.291                           0.321                      0.1012

TOTAL FOR CYCLE/LB FUEL                              MEAN:     0.867                           0.031                      0.0086
                                                  STD DEV:     0.085                           0.014                      0.0049
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DATE:   7/28/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  250    ENGINE TYPE AND MODEL:  O-320-E2A              SERIAL NUMBER:   L-16344-27AA

                            RATED HORSEPOWER:   150.

     ENGINE TOTAL TIME:     720. HRS

     FUEL: AV GAS 80/87               FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   74.00   FINISH   74.00

     ATMOSPHERIC PRESSURE:              START   29.84   FINISH   29.84

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     52.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:   5

COMMENTS:



                    CARB.    TEST      ENGINE        MEASURED        MEASURED       CALCULATED
                    HEATER   MODE       RPM          FUEL FLOW       AIR FLOW          F/A
                                                      LB/HR           LB/HR

IDLE-LOW                      1         -0.0          15.20          181.00          0.03369
IDLE/TAXI                     2         -0.0          18.80          223.00          0.04885
RUN UP                        3         -0.0          35.20          397.00          0.07349
RUN UP-LEAN                   4         -0.0          35.20          401.00          0.07286
RUN UP-RICH                   5         -0.0          34.00          388.00          0.07283


  TEST    EXHAUST     FXHAUST       CO          CO         THC        NO         NO         NO       ALDEHYDES     SMOKE     PARTICULATES
  MODE      GAS         GAS        (DRY)         2        (DRY)      (DRY)        2          X         (DRY)
            TEMP      PRESSURE   PERCENT V    (DRY)       PPMV       PPMV       (DRY)      (DRY)
          DEGREES F     PSIA                PERCENT V                           PPMV       PPMV

   1      314.00       -0.00       3.10        3.90     1537.00     14.00      -0.00      -0.00       6.00        -0.00         -0.00
   2      448.00       -0.00       4.70        5.60     1482.00     24.00      -0.00      -0.00       5.00        -0.00         -0.00
   3     1031.00       -0.00       8.30        7.30     2141.00     31.00      -0.00      -0.00      -0.00        -0.00         -0.00
   4      964.00       -0.00       8.10        7.40     1867.00     23.00      -0.00      -0.00      -0.00        -0.00         -0.00
   5     1099.00       -0.00       8.10        7.40     1812.00     22.00      -0.00      -0.00      -0.00        -0.00         -0.00


  TEST     MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE        CO         HC        NO2        CO2         NO        NOX         CO         HC        NO2        CO2         NO        NOX
            LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
           LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1        875.45     24.86       0.0      1730.51      0.65       0.65   13306.88     377.86       0.0   26303.74       9.87       9.87
   2        908.78     16.41       0.0      1701.32      0.76       0.76   17085.02     308.54       0.0   31984.85      14.33      14.33
   3       1060.37     15.66       0.0      1465.27      0.65       0.65   37323.13     551.39       0.0   51577.57      22.90      22.90
   4       1043.17     13.77       0.0      1497.41      0.49       0.49   36719.59     484.73       0.0   52708.77      17.13      17.13
   5       1043.54     13.37       0.0      1497.93      0.47       0.47   35480.24     454.57       0.0   50929.73      15.83      15.83
```

DATE: 7/30/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINE DATA **

CAL ID NUMBER: 259   ENGINE TYPE AND MODEL: O-320-E2A   SERIAL NUMBER: L-29302-27AA

RATED HORSEPOWER: 150.

ENGINE TOTAL TIME: 129. HRS

FUEL: AV GAS 80/87   FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 87.00 FINISH 86.00

ATMOSPHERIC PRESSURE: START 30.15 FINISH 30.15

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.01

RELATIVE HUMIDITY: 45.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 8

COMMENTS:

	CARB. HEATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
RUN UP		3	-0.0	19.30	220.00	0.06862
RUN UP-LEAN		4	-0.0	19.30	221.00	0.06807
TAKE-OFF		6	-0.0	42.20	472.00	0.07264
CLIMB		7	-0.0	42.20	472.00	0.07264
DESCENT		8	-0.0	24.60	295.00	0.06576
DESCENT	ON	8	-0.0	24.60	298.00	0.06521
APPROACH		9	-0.0	17.60	196.00	0.06850
TAXI		10	-0.0	5.30	65.00	0.06121

TEST MODE	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
3	1054.00	-0.00	7.50	7.00	2506.00	104.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1076.00	-0.00	7.40	7.00	2337.00	80.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1300.00	-0.00	8.40	7.00	2112.00	8.00	-0.00	-0.00	-0.00	-0.00	-0.00
7	1300.00	-0.00	8.40	7.00	2112.00	8.00	-0.00	-0.00	10.00	-0.00	-0.00
8	1233.00	-0.00	6.30	7.70	1886.00	40.00	-0.00	-0.00	6.00	-0.00	-0.00
8	1211.00	-0.00	6.00	7.90	1830.00	108.00	-0.00	-0.00	5.00	-0.00	-0.00
9	942.00	-0.00	7.90	6.50	2900.00	66.00	-0.00	-0.00	7.00	-0.00	-0.00
10	471.00	-0.00	5.30	7.70	2112.00	68.00	-0.00	-0.00	4.00	-0.00	-0.00

TEST MODE	MASS EMI CC LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
3	1027.20	19.66	0.0	1506.36	2.34	2.34	19824.87	379.38	0.0	29072.69	45.15	45.15
4	1021.60	18.48	0.0	1518.39	1.81	1.81	19716.80	356.62	0.0	29304.96	35.01	35.01
6	1087.04	15.65	0.0	1423.32	0.17	0.17	45873.02	660.57	0.0	60064.01	7.18	7.18
7	1087.04	15.65	0.0	1423.32	0.17	0.17	45873.02	660.57	0.0	60064.01	7.18	7.18
8	897.02	15.38	0.0	1727.63	0.94	0.94	22066.71	378.34	0.0	42376.60	23.01	23.01
8	860.71	15.03	0.0	1780.62	2.54	2.54	21173.50	369.86	0.0	43803.31	62.60	62.60
9	1086.44	22.84	0.0	1404.53	1.49	1.49	19121.38	402.01	0.0	24719.74	26.24	26.24
10	810.47	18.50	0.0	1850.07	1.71	1.71	4295.47	98.03	0.0	9805.38	9.05	9.05

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DATE:   8/17/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  363    ENGINE TYPE AND MODEL:  IO-360-C                 SERIAL NUMBER:   50591-6CB

                            RATED HORSEPOWER:   210.

     ENGINE TOTAL TIME:    700. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   84.00   FINISH   84.00

     ATMOSPHERIC PRESSURE:              START   30.24   FINISH   30.24

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.02

     RELATIVE HUMIDITY:                     66.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:   8

COMMENTS:

 APPROACH MODE MISSING



                  CARB.    TEST     ENGINE       MEASURED      MEASURED      CALCULATED
                  HEATER   MODE      RPM         FUEL FLOW     AIR FLOW         F/A
                                                   LB/HR         LB/HR

IDLE-LOW                    1        -0.0          16.40         199.00       0.06361
IDLE/TAXI                   2        -0.0          19.90         262.00       0.06765
RUN UP                      3        -0.0          22.30         293.00       0.07011
RUN UP-LEAN                 4        -0.0          19.90         267.00       0.06789
RUN UP-RICH                 5        -0.0          19.90         272.00       0.06592
TAKE-OFF                    6        -0.0          91.40        1076.00       0.07859
CLIMB                       7        -0.0          59.80         781.00       0.07102
DESCENT                     8        -0.0          42.20         538.00       0.07248


  TEST   EXHAUST    EXHAUST      CO         CO        THC        NO         NO         NO      ALDEHYDES    SMOKE     PARTICULATES
  MODE     GAS        GAS       (DRY)        2       (DRY)      (DRY)        2          X        (DRY)
          TEMP     PRESSURE   PERCENT V    (DRY)      PPMV       PPMV      (DRY)      (DRY)
        DEGREES F    PSIA                PERCENT V                         PPMV       PPMV

   1     673.00     -0.00       2.80       9.40   16470.00     42.00     -0.00      -0.00      42.00      -0.00        -0.00
   2     729.00     -0.00       3.40      10.40    9882.00     56.00     -0.00      -0.00      35.00      -0.00        -0.00
   3     919.00     -0.00       4.30      10.70    3404.00    309.00     -0.00      -0.00      -0.00      -0.00        -0.00
   4     897.00     -0.00       3.50      10.90    4721.00    150.00     -0.00      -0.00      -0.00      -0.00        -0.00
   5     953.00     -0.00       3.20      11.10    1537.00    177.00     -0.00      -0.00      -0.00      -0.00        -0.00
   6    1289.00     -0.00       7.80       8.80    4282.00    262.00     -0.00      -0.00      -0.00      -0.00        -0.00
   7    1356.00     -0.00       4.70      10.60    2306.00    796.00     -0.00      -0.00      18.00      -0.00        -0.00
   8    1267.00     -0.00       5.50      10.10    2086.00    564.00     -0.00      -0.00      -0.00      -0.00        -0.00


  TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1      408.51     137.62       0.0     2154.83       1.01       1.01    6699.58    2256.99       0.0    35339.13      16.51      16.51
   2      464.48      77.32       0.0     2232.33       1.26       1.26    9243.11    1538.61       0.0    44423.31      25.01      25.01
   3      566.28      25.67       0.0     2214.05       6.68       6.68   12628.09     572.54       0.0    49373.27     149.06     149.06
   4      475.44      36.73       0.0     2326.45       3.35       3.35    9461.29     730.91       0.0    46296.39      66.60      66.60
   5      447.27      12.30       0.0     2437.72       4.06       4.06    8900.73     244.85       0.0    48510.62      80.87      80.87
   6      925.40      29.10       0.0     1640.42       5.11       5.11   84581.13    2659.32       0.0   149933.94     466.66     466.66
   7      611.38      17.18       0.0     2166.49      17.01      17.01   36560.53    1027.35       0.0   129556.31    1017.06    1017.06
   8      702.86      15.27       0.0     2028.00      11.84      11.84   29660.84     644.29       0.0    85581.56     499.60     499.60
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DATE:  7/14/71
TEST ORGANIZATION:  SCOTT/GEN AVIATION
ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL
ENGINE DATA ****************************************************************************************
                                                                  SERIAL NUMBER:   203247-70R8
     CAL ID NUMBER:  164    ENGINE TYPE AND MODEL:  O-470-R
                            RATED HORSEPOWER:   230.

     ENGINE TOTAL TIME:    182. HRS
     FUEL: AV GAS 80/87             FUEL H/C RATIO:    1.840
*****************************************************************************************************
OPERATIONAL DATA ***********************************************************************************
     INLET AIR TEMPERATURE, DEGREES F:  START   91.00   FINISH   91.00
     ATMOSPHERIC PRESSURE:              START   29.95   FINISH   29.95
     INLET AIR HUMIDITY, GRN H2O/LB AIR:    0.01
     RELATIVE HUMIDITY:                   40.00  PERCENT
     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00
     SAMPLE LINE TRANSPORT TIME, SEC:    1.60
 NUMBER OF TESTS:  10
 COMMENTS:
  APPROACH MODE MISSING


                                                        MEASURED     MEASURED    CALCULATED
                  CARB.    TEST      ENGINE            FUEL FLOW     AIR FLOW       F/A
                  HEATER   MODE       RPM                LB/HR        LB/HR

 IDLE-LOW                   1        -0.0               10.60        119.00       0.07215
 IDLE/TAXI                  2        -0.0               15.00        184.00       0.06879
 RUN UP                     3        -0.0               35.50        449.00       0.06875
 RUN UP-LEAN                4        -0.0               34.60        441.00       0.06498
 RUN UP-RICH                5        -0.0               34.60        446.00       0.06624
 TAKE-OFF                   6        -0.0              106.60       1240.00       0.07406
 CLIMB                      7        -0.0              101.00       1330.00       0.06864
 DESCENT                    8        -0.0               52.50        681.00       0.06917
 DESCENT          ON        8        -0.0               60.30        646.00       0.07646
 TAXI                      10        -0.0               11.50        146.00       0.06923


                                                                  NO          NO        ALDEHYDES    SMOKE    PARTICULATES
 TEST   EXHAUST    EXHAUST      CO        CO        THC       NO       2           X        (DRY)
 MODE     GAS        GAS       (DRY)       2       (DRY)     (DRY)   (DRY)       (DRY)
          TEMP     PRESSURE  PERCENT V   (DRY)     PPMV      PPMV    PPMV        PPMV
       DEGREES F     PSIA              PERCENT V

   1     -0.00      -0.00      7.20      7.40    9395.00    10.00   -0.00       -0.00       30.00      -0.00       -0.00
   2     -0.00      -0.00      6.10      8.60    2009.00    41.00   -0.00       -0.00       11.00      -0.00       -0.00
   3     -0.00      -0.00      5.60      9.20    1359.00   122.00   -0.00       -0.00       -0.00      -0.00       -0.00
   4     -0.00      -0.00      5.10      8.90    1004.00    70.00   -0.00       -0.00       -0.00      -0.00       -0.00
   5     -0.00      -0.00      5.00      9.30    1004.00    78.00   -0.00       -0.00       -0.00      -0.00       -0.00
   6     -0.00      -0.00      7.90      7.90    1832.00   150.00   -0.00       -0.00        8.00      -0.00       -0.00
   7     -0.00      -0.00      4.70     10.20     827.00    94.00   -0.00       -0.00        8.00      -0.00       -0.00
   8    149.00      -0.00      5.10      9.90     768.00    78.00   -0.00       -0.00        6.00      -0.00       -0.00
   8    133.00      -0.00      9.80      6.40    1773.00    22.00   -0.00       -0.00        4.00      -0.00       -0.00
  10    128.00      -0.00      5.50      9.40    1536.00    45.00   -0.00       -0.00        2.00      -0.00       -0.00


                                                                                                                  MASS EMI   MASS EMI
                                                                   MASS EMI   MASS EMI   MASS EMI    MASS EMI        NO        NOX
 TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI      CO         HC         NO2         CO2        LB/HR      LB/HR
 MODE      CO         HC         NO2        CO2        NO         NOX       LB/HR      LB/HR       LB/HR       LB/HR
         LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K
        LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1     936.05      69.95       0.0      1511.59      0.21       0.21     9922.09     741.50       0.0     16022.87       2.26       2.26
   2     827.03      15.60       0.0      1832.00      0.91       0.91    12405.39     233.99       0.0     27480.02      13.70      13.70
   3     757.46      10.53       0.0      1955.22      2.71       2.71    26889.74     373.73       0.0     69410.44      96.22      96.22
   4     730.70       8.24       0.0      2003.54      1.65       1.65    25282.29     285.05       0.0     69322.56      57.00      57.00
   5     701.45       8.07       0.0      2049.97      1.80       1.80    24270.18     279.11       0.0     70929.06      62.19      62.19
   6     998.54      13.26       0.0      1568.93      3.11       3.11   106444.25    1413.73       0.0    167247.88     331.98     331.98
   7     633.74       6.39       0.0      2160.98      2.08       2.08    64007.48     645.04       0.0    218258.56     210.27     210.27
   8     683.38       5.89       0.0      2084.33      1.72       1.72    35877.48     309.43       0.0    109427.19      90.13      90.13
   8    1208.89      12.53       0.0      1240.45      0.45       0.45    72895.81     755.32       0.0     74798.88      26.88      26.88
  10     738.12      11.81       0.0      1982.11      0.99       0.99     8488.32     135.77       0.0     22794.23      11.41      11.41
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************************

    CAL ID NUMBER:  165    ENGINE TYPE AND MODEL:  O-470-R                  SERIAL NUMBER:   20347-70RC

                           RATED HORSEPOWER:   230.

    ENGINE TOTAL TIME:    182. HRS

    FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   91.00   FINISH   91.00

    ATMOSPHERIC PRESSURE:              START   29.95   FINISH   29.95

    INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

    RELATIVE HUMIDITY:                     40.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

    SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  10

 COMMENTS:

  TAKE OFF MODE MISSING


                        CARB.     TEST      ENGINE       MEASURED       MEASURED      CALCULATED
                        HEATER    MODE       RPM         FUEL FLOW      AIR FLOW         F/A
                                                           LB/HR          LB/HR

 IDLE-LOW                          1         -0.0          8.90         101.00        0.07439
 IDLE/TAXI                         2         -0.0         14.10         175.00        0.07091
 RUN UP                            3         -0.0         34.60         446.00        0.07118
 RUN UP-LEAN                       4         -0.0         34.60         447.00        0.07019
 RUN UP-RICH                       5         -0.0         34.60         449.00        0.07058
 CLIMB                             7         -0.0        102.10        1181.00        0.07582
 DESCENT                           8         -0.0         53.50         689.00        0.07057
 DFSCENT                ON         8         -0.0         51.50         545.00        0.07903
 APPROACH                          9         -0.0         35.50         442.00        0.06924
 TAXI                             10         -0.0         12.40         157.00        0.06842


   TEST   EXHAUST     EXHAUST       CO          CO          THC        NO         NO          NO      ALDEHYDES     SMOKE      PARTICULATES
   MODE     GAS         GAS        (DRY)          2         (DRY)     (DRY)        2           X        (DRY)
            TEMP      PRESSURE   PERCENT V    (DRY)        PPMV      PPMV       (DRY)       (DRY)
          DEGREES F     PSIA                PERCENT V                            PPMV        PPMV

    1      762.00      -0.00       7.30        7.90      8569.00     13.00      -0.00       -0.00      29.00       -0.00        -0.00
    2      942.00      -0.00       6.10        9.10      1959.00     52.00      -0.00       -0.00      18.00       -0.00        -0.00
    3     1323.00      -0.00       5.40       10.00      1199.00    113.00      -0.00       -0.00      -0.00       -0.00        -0.00
    4     1267.00      -0.00       5.30        9.90       965.00     93.00      -0.00       -0.00      -0.00       -0.00        -0.00
    5     1334.00      -0.00       5.20       10.10       965.00     95.00      -0.00       -0.00      -0.00       -0.00        -0.00
    7     1581.00      -0.00       8.30        7.90      1609.00     26.00      -0.00       -0.00       8.00       -0.00        -0.00
    8     1569.00      -0.00       5.40        9.90       790.00     89.00      -0.00       -0.00       3.00       -0.00        -0.00
    8     1457.00      -0.00      10.30        6.40      2252.00     23.00      -0.00       -0.00       4.00       -0.00        -0.00
    9     1278.00      -0.00       6.00        8.90      1199.00    121.00      -0.00       -0.00      14.00       -0.00        -0.00
   10     1031.00      -0.00       5.40        9.30      1726.00     53.00      -0.00       -0.00      13.00       -0.00        -0.00


   TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI    MASS EMI   MASS EMI   MASS EMI    MASS EMI   MASS EMI
   MODE       CO         HC         NO2        CO2        NO         NOX        CO          HC         NO2        CO2         NO         NOX
            LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR       LB/HR      LB/HR      LB/HR       LB/HR      LB/HR
           LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    1      918.47      61.75       0.0      1561.73      0.27       0.27     8174.34     549.55      0.0      13899.38       2.39       2.39
    2      800.44      14.72       0.0      1876.19      1.12       1.12    11286.14     207.58      0.0      26454.24      15.80      15.80
    3      702.92       8.94       0.0      2045.27      2.42       2.42    24321.06     309.28      0.0      70766.38      83.60      83.60
    4      699.98       7.30       0.0      2054.39      2.02       2.02    24219.30     252.56      0.0      71081.94      69.81      69.81
    5      682.31       7.25       0.0      2082.28      2.05       2.05    23607.98     250.92      0.0      72046.94      70.84      70.84
    7     1024.88      11.38       0.0      1532.71      0.53       0.53   104640.13    1161.77      0.0     156489.63      53.84      53.84
    8      709.36       5.94       0.0      2043.37      1.92       1.92    37950.80     317.98      0.0     109320.31     102.74     102.74
    8     1229.43      15.40       0.0      1200.29      0.45       0.45    63315.86     792.85      0.0      61814.95      23.22      23.22
    9      807.02       9.24       0.0      1880.89      2.67       2.67    28649.32     327.89      0.0      66771.50      94.90      94.90
   10      733.51      13.43       0.0      1984.89      1.18       1.18     9095.58     166.50      0.0      24612.61      14.66      14.66
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DATE:   8/17/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ******************************************************************************************

     CAL ID NUMBER:  391     ENGINE TYPE AND MODEL:  O-470-R                  SERIAL NUMBER:   133510-6-RA

                             RATED HORSEPOWER:   230.

     ENGINE TOTAL TIME:      69. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA *************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   83.50   FINISH   83.50

     ATMOSPHERIC PRESSURE:              START   30.12   FINISH   30.12

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                     38.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:   8

COMMENTS:



                      CARB.    TEST      ENGINE       MEASURED       MEASURED      CALCULATED
                      HEATER   MODE       RPM         FUEL FLOW      AIR FLOW         F/A
                                                        LB/HR          LB/HR

IDLE-LOW                        1         -0.0         12.40           77.00        0.08872
IDLE/TAXI                       2         -0.0         15.80          164.00        0.08667
RUN UP                          3         -0.0         30.90          383.00        0.07541
RUN UP-LEAN                     4         -0.0         30.00          402.00        0.07031
RUN UP-RICH                     5         -0.0         30.90          408.00        0.07088
TAKE-OFF                        6         -0.0         77.50         1148.00        0.06678
CLIMB                           7         -0.0         73.40           10.93        0.06497
DESCENT                         8         -0.0         41.10          565.00        0.07806


  TEST   EXHAUST    EXHAUST      CO          CO        THC        NO         NO         NO      ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS        GAS       (DRY)         2       (DRY)      (DRY)        2          X        (DRY)
           TEMP     PRESSURE  PERCENT V    (DRY)      PPMV       PPMV       (DRY)      (DRY)
        DEGREES F     PSIA               PERCENT V                          PPMV       PPMV

   1     538.00      -0.00       7.60       3.70   74911.00      3.00      -0.00      -0.00      36.00      -0.00        -0.00
   2     897.00      -0.00       9.90       7.50   12566.00     10.00      -0.00      -0.00      24.00      -0.00        -0.00
   3    1256.00      -0.00       6.20       9.70    5155.00    134.00      -0.00      -0.00      -0.00      -0.00        -0.00
   4    1390.00      -0.00       3.90      11.30    2255.00     80.00      -0.00      -0.00      -0.00      -0.00        -0.00
   5    1345.00      -0.00       4.30      10.90    3222.00     73.00      -0.00      -0.00      -0.00      -0.00        -0.00
   6    1681.00      -0.00       0.70      14.00    1442.00   3281.00      -0.00      -0.00      12.00      -0.00        -0.00
   7    1704.00      -0.00       0.50      13.80    1289.00   4206.00      -0.00      -0.00      12.00      -0.00        -0.00
   8    1592.00      -0.00       3.60      13.50    1933.00   2681.00      -0.00      -0.00


  TEST    MASS EMI   MASS EMI    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE       CO     [illegible]     NO2        CO2         NO        NOX         CO         HC         NO2        CO2         NO        NOX
           LB/1K       /1K        LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL     LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1       817.08     461.25       0.0       625.01       0.05       0.05   10131.77    5719.55      0.0     7750.17       0.66       0.66
   2      1072.03      77.93       0.0      1276.05       0.18       0.18   16937.99    1231.31      0.0    20161.65       2.81       2.81
   3       763.03      36.33       0.0      1875.68       2.71       2.71   23577.50    1122.74      0.0    57958.34      83.70      83.70
   4       510.77      16.91       0.0      2325.30       1.72       1.72   15323.16     507.43      0.0    69759.00      51.63      51.63
   5       559.65      24.02       0.0      2229.02       1.56       1.56   17293.18     742.13      0.0    68876.56      48.22      48.22
   6        95.27      11.24       0.0      2993.72      73.35      73.35    7383.20     871.08      0.0   232013.38    5684.25    5684.25
   7        70.01      10.34       0.0      3035.89      96.73      96.73    5138.40     758.69      0.0   222834.19    7099.93    7099.93
   8       420.56      12.93       0.0      2477.97      51.44      51.44   17284.94     531.55      0.0   101844.56    2114.38    2114.38
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DATE:   8/ 6/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:  268    ENGINE TYPE AND MODEL:  IO-520-P                SERIAL NUMBER:   110140-3-AA

                            RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:   1556. HRS

     FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   75.00   FINISH   79.00

     ATMOSPHERIC PRESSURE:              START   30.24   FINISH   30.24

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01

     RELATIVE HUMIDITY:                    49.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:     7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  10

COMMENTS:

 NO FUEL FLOW DATA


                       CARB.     TEST      ENGINE       MEASURED        MEASURED        CALCULATED
                       HEATER    MODE       RPM         FUEL FLOW       AIR FLOW            F/A
                                                          LB/HR          LB/HR

IDLE-LOW                          1         -0.0         -0.00           -0.00           0.07354
IDLE/TAXI                         2         -0.0         -0.00           -0.00           0.07797
RUN UP                            3         -0.0         -0.00           -0.00           0.07250
RUN UP-LEAN                       4         -0.0         -0.00           -0.00           0.07178
RUN UP-RICH                       5         -0.0         -0.00           -0.00           0.07080
TAKE-OFF                          6         -0.0         -0.00           -0.00           0.06335
CLIMB                             7         -0.0         -0.00           -0.00           0.06312
DESCENT                           8         -0.0         -0.00           -0.00           0.06586
APPROACH                          9         -0.0         -0.00           -0.00           0.06901
TAXI                             10         -0.0         -0.00           -0.00           0.07952

  TEST    FXHAUST     EXHAUST      CO          CO        THC         NO         NO         NO       ALDEHYDES     SMOKE     PARTICULATES
  MODE      GAS         GAS       (DRY)         2       (DRY)      (DRY)        2          X         (DRY)
            TEMP      PRESSURE  PERCENT V    (DRY)      PPMV       PPMV       (DRY)      (DRY)
          DEGREES F     PSIA              PERCENT V                           .PPMV      PPMV

   1      549.00      -0.00       7.00       7.70   11621.00      12.00      -0.00      -0.00       14.00       -0.00        -0.00
   2      684.00      -0.00       8.50       7.10   11621.00      15.00      -0.00      -0.00        9.00       -0.00        -0.00
   3     1076.00      -0.00       7.50       7.90    2480.00      47.00      -0.00      -0.00       -0.00       -0.00        -0.00
   4     1043.00      -0.00       6.90       8.40    2313.00      35.00      -0.00      -0.00       -0.00       -0.00        -0.00
   5     1076.00      -0.00       6.70       8.40    2202.00      32.00      -0.00      -0.00       -0.00       -0.00        -0.00
   6     1469.00      -0.00       2.60      11.00    2870.00     359.00      -0.00      -0.00       -0.00       -0.00        -0.00
   7     1469.00      -0.00       2.80      10.90    1310.00     213.00      -0.00      -0.00        5.00       -0.00        -0.00
   8     1390.00      -0.00       4.40       9.80    1533.00      -0.00      -0.00      -0.00        9.00       -0.00        -0.00
   9     1211.00      -0.00       6.50       8.20    2202.00      -0.00      -0.00      -0.00        5.00       -0.00        -0.00
  10      740.00      -0.00       8.30       7.10   16972.00      -0.00      -0.00      -0.00       14.00       -0.00        -0.00
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DATE:   8/ 6/71
TEST ORGANIZATION:  SCOTT/GEN AVIATION
ENGINF SUPPLIER:  TELEDYNE-CONTINENTAL
ENGINE DATA ****************************************************************************************************
    CAL ID NUMBER:  269    ENGINE TYPE AND MODEL:  IO-520-P              SERIAL NUMBER:    110140-3-AB
                           RATED HORSEPOWER:   300.
    ENGINE TOTAL TIME:   1556. HRS
    FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840
OPERATIONAL DATA ***********************************************************************************************
    INLET AIR TEMPERATURE, DEGREES F:  START   79.00   FINISH   80.00
    ATMOSPHERIC PRESSURE:              START   30.24   FINISH   30.24
    INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01
    RELATIVE HUMIDITY:                     42.00  PERCENT
    SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00
    SAMPLE LINE TRANSPORT TIME, SEC:    1.60
 NUMBER OF TESTS:  10
 COMMENTS:
  NO FUEL FLOW DATA

                   CARB.   TEST      ENGINE       MEASURED       MEASURED      CALCULATED
                  HEATER   MODE       RPM        FUEL FLOW       AIR FLOW         F/A
                                                   LB/HR          LB/HR

 IDLE-LOW                    1        -0.0         -0.00          -0.00         0.07514
 IDLE/TAXI                   2        -0.0         -0.00          -0.00         0.07659
 RUN UP                      3        -0.0         -0.00          -0.00         0.07666
 RUN UP-LEAN                 4        -0.0         -0.00          -0.00         0.07591
 RUN UP-RICH                 5        -0.0         -0.00          -0.00         0.07498
 TAKE-OFF                    6        -0.0         -0.00          -0.00         0.07352
 CLIMB                       7        -0.0         -0.00          -0.00         0.07127
 DESCENT                     8        -0.0         -0.00          -0.00         0.07339
 APPROACH                    9        -0.0         -0.00          -0.00         0.07393
 TAXI                       10        -0.0         -0.00          -0.00         0.07718

  TEST   EXHAUST    EXHAUST       CO         CO         THC        NO        NO        NO     ALDEHYDES    SMOKE   PARTICULATES
  MODE     GAS        GAS       (DRY)         2        (DRY)     (DRY)        2         X       (DRY)
          TEMP     PRESSURE   PERCENT V    (DRY)       PPMV      PPMV      (DRY)     (DRY)
        DEGREES F    PSIA               PERCENT V                          PPMV      PPMV

   1     381.00     -0.00       6.80       4.60   45851.00     -0.00     -0.00     -0.00     17.00      -0.00      -0.00
   2    1435.00     -0.00       7.20       7.00   22677.00     -0.00     -0.00     -0.00     24.00      -0.00      -0.00
   3     964.00     -0.00       8.00       8.30    2731.00     -0.00     -0.00     -0.00     -0.00      -0.00      -0.00
   4     942.00     -0.00       7.40       8.80    2511.00     -0.00     -0.00     -0.00     -0.00      -0.00      -0.00
   5     986.00     -0.00       7.20       8.80    2511.00     -0.00     -0.00     -0.00     -0.00      -0.00      -0.00
   6    1390.00     -0.00       3.70      12.20    2952.00     -0.00     -0.00     -0.00      9.00      -0.00      -0.00
   7    1424.00     -0.00       3.10      12.50    1241.00     -0.00     -0.00     -0.00      9.00      -0.00      -0.00
   8    1278.00     -0.00       5.20      10.70    1517.00     -0.00     -0.00     -0.00      5.00      -0.00      -0.00
   9    1166.00     -0.00       6.30       9.60    1848.00     -0.00     -0.00     -0.00     -0.00      -0.00      -0.00
  10     773.00     -0.00       8.30       6.70   15642.00     -0.00     -0.00     -0.00
```

```
DATE:   8/ 6/71
TEST ORGANIZATION:  SCOTT/GEN AVIATION
ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL
ENGINE DATA ****************************************************************************************************
     CAL ID NUMBER:  270    ENGINE TYPE AND MODEL:  IO-520-P                  SERIAL NUMBER:   110140-3AC
                            RATED HORSEPOWER:   300.
     ENGINE TOTAL TIME:   1556. HRS
     FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840
OPERATIONAL DATA ***********************************************************************************************
     INLET AIR TEMPERATURE, DEGREES F:  START   83.00   FINISH   83.00
     ATMOSPHERIC PRESSURE:              START   30.24   FINISH   30.24
     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01
     RELATIVE HUMIDITY:                     40.00  PERCENT
     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00
     SAMPLE LINE TRANSPORT TIME, SEC:    1.60
NUMBER OF TESTS:  10
COMMENTS:
 NO FUEL FLOW DATA


                    CARB.     TEST      ENGINE       MEASURED       MEASURED      CALCULATED
                   HEATER     MODE       RPM         FUEL FLOW      AIR FLOW         F/A
                                                       LB/HR         LB/HR

IDLE-LOW                       1         -0.0         -0.00          -0.00        0.05646
IDLE/TAXI                      2         -0.0         -0.00          -0.00        0.07501
RUN UP                         3         -0.0         -0.00          -0.00        0.07160
RUN UP-LEAN                    4         -0.0         -0.00          -0.00        0.06958
RUN UP-RICH                    5         -0.0         -0.00          -0.00        0.07376
TAKE-OFF                       6         -0.0         -0.00          -0.00        0.06777
CLIMB                          7         -0.0         -0.00          -0.00        0.06502
DESCENT                        8         -0.0         -0.00          -0.00        0.06629
APPROACH                       9         -0.0         -0.00          -0.00        0.06802
TAXI                          10         -0.0         -0.00          -0.00        0.07531

   TEST   EXHAUST    EXHAUST       CO         CO         THC        NO         NO         NO      ALDEHYDES    SMOKE    PARTICULATES
   MODE     GAS        GAS       (DRY)         2        (DRY)      (DRY)        2          X        (DRY)
           TEMP     PRESSURE   PERCENT V    (DRY)       PPMV       PPMV      (DRY)      (DRY)
         DEGREES F    PSIA                PERCENT V                          PPMV       PPMV

    1     594.00     -0.00        4.20       4.40   34110.00      0.0       -0.00      -0.00      39.00      -0.00        -0.00
    2     796.00     -0.00        6.10       8.00   21068.00     30.00      -0.00      -0.00      41.00      -0.00        -0.00
    3    1099.00     -0.00        6.50       8.80    2229.00     71.00      -0.00      -0.00      -0.00      -0.00        -0.00
    4    1110.00     -0.00        5.30       9.70    1505.00    108.00      -0.00      -0.00      -0.00      -0.00        -0.00
    5    1054.00     -0.00        6.20       9.70    1561.00    102.00      -0.00      -0.00      -0.00      -0.00        -0.00
    6    1592.00     -0.00        3.20      11.40    2787.00     -0.00      -0.00      -0.00      -0.00      -0.00        -0.00
    7    1592.00     -0.00        2.40      11.80    1059.00     90.00      -0.00      -0.00      15.00      -0.00        -0.00
    8    1446.00     -0.00        4.60       9.70    1393.00    418.00      -0.00      -0.00      15.00      -0.00        -0.00
    9    1300.00     -0.00        5.70       8.90    1561.00    256.00      -0.00      -0.00      14.00      -0.00        -0.00
   10     942.00     -0.00        7.70       7.00   14882.00     29.00      -0.00      -0.00      19.00      -0.00        -0.00
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```
DATE:   8/ 6/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  262    ENGINE TYPE AND MODEL:  IO-540-C4B5                 SERIAL NUMBER:   L-901-48A

                            RATED HORSEPOWER:   250.

     ENGINE TOTAL TIME:   1318. HRS

     FUEL: AV GAS 100/130          FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   82.00   FINISH   83.00

     ATMOSPHERIC PRESSURE:              START   29.90   FINISH   29.90

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.02

     RELATIVE HUMIDITY:                     65.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

 NUMBER OF TESTS:  10

 COMMENTS:

  NO FUEL FLOW DATA


                      CARB.    TEST     ENGINE      MEASURED       MEASURED      CALCULATED
                      HEATER   MODE       RPM       FUEL FLOW      AIR FLOW          F/A
                                                      LB/HR          LB/HR

 IDLE-LOW                        1       -0.0         -0.00          -0.00        0.08567
 IDLE/TAXI                       2       -0.0         -0.00          -0.00        0.08431
 RUN UP                          3       -0.0         -0.00          -0.00        0.07898
 RUN UP-LEAN                     4       -0.0         -0.00          -0.00        0.07856
 RUN UP-RICH                     5       -0.0         -0.00          -0.00        0.07827
 TAKE-OFF                        6       -0.0         -0.00          -0.00        0.09348
 CLIMB                           7       -0.0         -0.00          -0.00        0.09578
 DESCENT                         8       -0.0         -0.00          -0.00        0.09134
 APPROACH                        9       -0.0         -0.00          -0.00        0.08322
 TAXI                           10       -0.0         -0.00          -0.00        0.08587


                                                                             NO          NO      ALDEHYDES     SMOKE     PARTICULATES
   TEST   EXHAUST     EXHAUST        CO          CO        THC       NO       2           X        (DRY)
   MODE     GAS         GAS         (DRY)         2       (DRY)    (DRY)    (DRY)       (DRY)
           TEMP      PRESSURE    PERCENT V     (DRY)      PPMV     PPMV     PPMV        PPMV
         DEGREES F     PSIA                 PERCENT V

    1     628.00      -0.00        8.50       4.50   52045.00    0.0      -0.00       -0.00      63.00       -0.00        -0.00
    2     740.00      -0.00        9.70       6.40   19599.00    0.0      -0.00       -0.00      46.00       -0.00        -0.00
    3    1222.00      -0.00        9.30       7.40    2965.00    0.0      -0.00       -0.00      -0.00       -0.00        -0.00
    4    1143.00      -0.00        9.20       7.40    3074.00    0.0      -0.00       -0.00      -0.00       -0.00        -0.00
    5    1233.00      -0.00        9.10       7.50    2525.00    0.0      -0.00       -0.00      -0.00       -0.00        -0.00
    6    1300.00      -0.00       12.90       6.80    3349.00    0.0      -0.00       -0.00      12.00       -0.00        -0.00
    7    1256.00      -0.00       12.60       7.70    3129.00    0.0      -0.00       -0.00       9.00       -0.00        -0.00
    8    1256.00      -0.00       12.10       7.20    3184.00    0.0      -0.00       -0.00       6.00       -0.00        -0.00
    9    1143.00      -0.00        9.90       7.70    3294.00    0.0      -0.00       -0.00      33.00       -0.00        -0.00
   10     673.00      -0.00        8.40       4.80   50728.00    0.0      -0.00       -0.00
```

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DATE:   8/ 6/71

TEST ORGANIZATION:  SCOTT/GEN AVIATION

ENGINE SUPPLIER:  LYCOMING

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  263    ENGINE TYPE AND MODEL:  IO-540-C4B5             SERIAL NUMBER:   L-901-48B

                            RATED HORSEPOWER:   250.

     ENGINE TOTAL TIME:   1318. HRS

     FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   83.00   FINISH   86.00

     ATMOSPHERIC PRESSURE:              START   29.90   FINISH   29.90

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.02

     RELATIVE HUMIDITY:                    61.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.60

NUMBER OF TESTS:  10

COMMENTS:

 NO FUEL FLOW DATA



                      CARB.    TEST     ENGINE       MEASURED       MEASURED      CALCULATED
                     HEATER    MODE      RPM         FUEL FLOW      AIR FLOW         F/A
                                                       LB/HR          LB/HR

IDLE-LOW                         1       -0.0          -0.00          -0.00        0.08317
IDLE/TAXI                        2       -0.0          -0.00          -0.00        0.08091
RUN UP                           3       -0.0          -0.00          -0.00        0.07452
RUN UP-LEAN                      4       -0.0          -0.00          -0.00        0.07252
RUN UP-RICH                      5       -0.0          -0.00          -0.00        0.07504
TAKE-OFF                         6       -0.0          -0.00          -0.00        0.08789
CLIMB                            7       -0.0          -0.00          -0.00        0.08119
DESCENT                          8       -0.0          -0.00          -0.00        0.08823
APPROACH                         9       -0.0          -0.00          -0.00        0.08432
TAXI                            10       -0.0          -0.00          -0.00        0.08305


  TEST   EXHAUST    EXHAUST      CO        CO         THC        NO       NO        NO    ALDEHYDES   SMOKE   PARTICULATES
  MODE     GAS        GAS       (DRY)       2        (DRY)      (DRY)      2         X      (DRY)
          TEMP     PRESSURE  PERCENT V   (DRY)       PPMV       PPMV     (DRY)     (DRY)
        DEGREES F    PSIA               PERCENT V                        PPMV      PPMV

   1     516.00     -0.00       6.40      4.50  67866.00      28.00     -0.00     -0.00     59.00     -0.00        -0.00
   2     650.00     -0.00       7.50      5.40  43699.00      43.00     -0.00     -0.00     67.00     -0.00        -0.00
   3    1166.00     -0.00       7.90      7.80   3752.00     115.00     -0.00     -0.00     -0.00     -0.00        -0.00
   4    1177.00     -0.00       7.40      7.90   3531.00      87.00     -0.00     -0.00     -0.00     -0.00        -0.00
   5    1233.00     -0.00       8.00      7.90   2924.00      71.00     -0.00     -0.00     -0.00     -0.00        -0.00
   6    1323.00     -0.00      11.80      6.70   3366.00     131.00     -0.00     -0.00     -0.00     -0.00        -0.00
   7    1289.00     -0.00      10.30      6.80   3200.00      45.00     -0.00     -0.00     12.00     -0.00        -0.00
   8    1267.00     -0.00      10.90      7.80   3090.00      51.00     -0.00     -0.00     21.00     -0.00        -0.00
   9    1166.00     -0.00       9.50      8.40   3255.00      78.00     -0.00     -0.00      6.00     -0.00        -0.00
  10     740.00     -0.00       9.30      5.40  30126.00      75.00     -0.00     -0.00     27.00     -0.00        -0.00
```

DATE: 8/ 6/71

TEST ORGANIZATION: SCOTT/GEN AVIATION

ENGINE SUPPLIER: LYCOMING

ENGINF DATA **

CAL ID NUMBER: 264 ENGINE TYPE AND MODEL: IO-540-C4B5 SERIAL NUMBER: L-901-48C

RATED HORSEPOWER: 250.

ENGINE TOTAL TIME: 1319. HRS

FUEL: AV GAS 100/130 FUEL H/C RATIO: 1.840

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 86.00 FINISH 87.00

ATMOSPHERIC PRESSURE: START 29.90 FINISH 29.90

INLET AIR HUMIDITY, GRN H2O/LB AIR: 0.02

RFLATIVE HUMIDITY: 60.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: 7.00

SAMPLE LINF TRANSPORT TIME, SEC: 1.60

NUMBER OF TESTS: 10

COMMENTS:

NO FUEL FLOW DATA

	CARB. HFATER	TEST MODE	ENGINE RPM	MEASURED FUEL FLOW LB/HR	MEASURED AIR FLOW LB/HR	CALCULATED F/A
IDLF-LOW		1	-0.0	-0.00	-0.00	0.08588
IDLE/TAXI		2	-0.0	-0.00	-0.00	0.08220
RUN UP		3	-0.0	-0.00	-0.00	0.07613
RUN UP-LEAN		4	-0.0	-0.00	-0.00	0.07585
RUN UP-RICH		5	-0.0	-0.00	-0.00	0.07568
TAKE-OFF		6	-0.0	-0.00	-0.00	0.09024
CLIMB		7	-0.0	-0.00	-0.00	0.09657
DESCENT		8	-0.0	-0.00	-0.00	0.09267
APPROACH		9	-0.0	-0.00	-0.00	0.08541
TAXI		10	-0.0	-0.00	-0.00	0.09229

TEST MODE	FXHAUST GAS TEMP DEGRFES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PERCENT V	CO 2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO 2 (DRY) PPMV	NO X (DRY) PPMV	ALDEHYDES (DRY)	SMOKE	PARTICULATES
1	538.00	-0.00	7.50	5.20	56141.00	19.00	-0.00	-0.00	84.00	-0.00	-0.00
2	661.00	-0.00	7.90	6.50	32278.00	40.00	-0.00	-0.00	62.00	-0.00	-0.00
3	1166.00	-0.00	7.90	8.20	3504.00	140.00	-0.00	-0.00	-0.00	-0.00	-0.00
4	1188.00	-0.00	7.70	8.40	3062.00	98.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	1233.00	-0.00	7.80	8.30	2621.00	98.00	-0.00	-0.00	-0.00	-0.00	-0.00
6	1289.00	-0.00	12.10	6.90	3559.00	55.00	-0.00	-0.00	15.00	-0.00	-0.00
7	1289.00	-0.00	12.30	8.20	3338.00	55.00	-0.00	-0.00	10.00	-0.00	-0.00
8	1267.00	-0.00	11.30	8.40	3173.00	67.00	-0.00	-0.00	9.00	-0.00	-0.00
9	1166.00	-0.00	9.40	8.80	2952.00	105.00	-0.00	-0.00	32.00	-0.00	-0.00
10	695.00	-0.00	9.50	5.00	51479.00	35.00	-0.00	-0.00			

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DATE:   8/ 6/71
TEST ORGANIZATION:  SCOTT/GEN AVIATION
ENGINE SUPPLIER:  LYCOMING
ENGINE DATA ****************************************************************************************************************
     CAL ID NUMBER:  265    ENGINE TYPE AND MODEL:  IO-540-C4B5                   SERIAL NUMBER:   L-1623-48A
                            RATED HORSEPOWER:   250.

     ENGINE TOTAL TIME:   1304. HRS
     FUEL:                            FUEL H/C RATIO:    0.251
 OPERATIONAL DATA **************************************************************************************************************
      INLET AIR TEMPERATURE, DEGREES F:  START   86.00   FINISH   86.00
      ATMOSPHERIC PRESSURE:              START   29.90   FINISH   29.90
      INLET AIR HUMIDITY, GRN H2O/LB AIR:     0.01
      RELATIVE HUMIDITY:                     52.00  PERCENT
      SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    7.00
      SAMPLE LINE TRANSPORT TIME, SEC:    1.60
  NUMBER OF TESTS:  10
  COMMENTS:
   NO FUEL FLOW DATA


                       CARB.   TEST      ENGINE       MEASURED       MEASURED      CALCULATED
                       HEATER  MODE       RPM        FUEL FLOW       AIR FLOW         F/A
                                                       LB/HR          LB/HR

  IDLE-LOW                       1        -0.0         -0.00          -0.00         0.08279
  IDLE/TAXI                      2        -0.0         -0.00          -0.00         0.07913
  RUN UP                         3        -0.0         -0.00          -0.00         0.08267
  RUN UP-LEAN                    4        -0.0         -0.00          -0.00         0.08039
  RUN UP-RICH                    5        -0.0         -0.00          -0.00         0.08258
  TAKE-OFF                       6        -0.0         -0.00          -0.00         0.12776
  CLIMB                          7        -0.0         -0.00          -0.00         0.10178
  DESCENT                        8        -0.0         -0.00          -0.00         0.09987
  APPROACH                       9        -0.0         -0.00          -0.00         0.09340
  TAXI                          10        -0.0         -0.00          -0.00         0.07826

                                                                                                         ALDEHYDES    SMOKE     PARTICULATES
                                                             THC        NO         NO          NO         (DRY)
   TEST   EXHAUST    EXHAUST        CO          CO          (DRY)      (DRY)         2           X
   MODE     GAS        GAS         (DRY)         2           PPMV       PPMV       (DRY)       (DRY)
            TEMP     PRESSURE   PERCENT V     (DRY)                                 PPMV        PPMV
         DEGREES F     PSIA                 PERCENT V

    1       78.00     -0.00        9.20        4.80   48245.00       5.00       -0.00       -0.00       76.00      -0.00       -0.00
    2      830.00     -0.00        9.60        6.70   16803.00      16.00       -0.00       -0.00       47.00      -0.00       -0.00
    3     1211.00     -0.00       12.40        5.60    5324.00      18.00       -0.00       -0.00       -0.00      -0.00       -0.00
    4     1256.00     -0.00       10.50        5.50   21794.00      19.00       -0.00       -0.00       -0.00      -0.00       -0.00
    5     1300.00     -0.00       12.20        5.80    5324.00      11.00       -0.00       -0.00       -0.00      -0.00       -0.00
    6     1334.00     -0.00       19.30        8.00    4769.00      11.00       -0.00       -0.00       -0.00      -0.00       -0.00
    7     1278.00     -0.00       15.20        6.90    4436.00      10.00       -0.00       -0.00       16.00      -0.00       -0.00
    8     1278.00     -0.00       14.90        6.80    4492.00      11.00       -0.00       -0.00       13.00      -0.00       -0.00
    9     1177.00     -0.00       13.80        6.50    5157.00      11.00       -0.00       -0.00       12.00      -0.00       -0.00
   10      773.00     -0.00        9.20        4.80   37931.00      14.00       -0.00       -0.00       40.00      -0.00       -0.00
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TABLE II

LIGHT-UTILITY PISTON ENGINES

TELEDYNE/CONTINENTAL

CONTENTS:

II-2 TO II-20	INDIVIDUAL ENGINE RUNS – COMPLETELY PROCESSED – CLIMB LEAN MODE
II-21	MODEL SUMMARY – CLIMB LEAN MODE
II-22 TO II-34	INDIVIDUAL ENGINE RUNS – CLIMB RICH MODE
II-35	MODEL SUMMARY – CLIMB RICH MODE
II-36	INDIVIDUAL RUN – MASS EMISSION CONVERSION ONLY

```
DATE:   6/18/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ******************************************************************************************

     CAL ID NUMBER:  201     ENGINE TYPE AND MODEL:  O-200-A                    SERIAL NUMBER:     213457A

                             RATED [illegible]EPOWER:   100.

     ENGINE TOTAL TIME:      -0. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA *************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.91   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    73.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   9

COMMENTS:


                               TEST             POWER              MEASURED      AIR FLOW    CALCULATED
                               MODE       SHAFT        PERCENT       FUEL         LB/HR          F/A
                                           HP           RATED        FLOW
                                                                     LB/HR

COLD START + 130 SEC             1        0.0            0           4.00        27.00       0.14815
TAXI-IDLE LOW                    2        2.60           2           5.40        45.00       0.12000
TAXI-IDLE HIGH                   3        6.50           6           8.20        72.00       0.11389
RUN-UP                           4       20.40          20          13.80       153.00       0.09020
TAKE-OFF 100%                    6       89.40          89          53.00       558.00       0.09498
CLIMB-LEAN                       9       88.80          88          51.00       558.00       0.09140
APPROACH                        10       30.00          29          23.00       216.00       0.10648
TAXI-IDLE                       11        7.20           7           9.00        72.00       0.12500
HOT START                       13        0.0            0           4.00        27.00       0.14815


 TEST   EXHAUST    EXHAUST       CO          CO        THC        NO        NO         NO      ALDEHYDES    SMOKE     PARTICULATES
 MODE     GAS        GAS        (DRY)         2       (WET)     (DRY)        2          X
          TEMP     PRESSURE     PPMV       (DRY)      PPMV      PPMV      (DRY)      (DRY)
       DEGREES F     PSIA               PERCENT V                          PPMV       PPMV

  1      -0.00      -0.00     59000.00    -0.00      -0.00     40.00     -0.00      -0.00      -0.00      -0.00        -0.00
  2      -0.00      -0.00     62000.00    -0.00      -0.00     25.00     -0.00      -0.00      -0.00      -0.00        -0.00
  3      -0.00      -0.00     64000.00    -0.00      -0.00     30.00     -0.00      -0.00      -0.00      -0.00        -0.00
  4      -0.00      -0.00     74000.00    -0.00      -0.00     35.00     -0.00      -0.00      -0.00      -0.00        -0.00
  6      -0.00      -0.00    102000.00    -0.00      -0.00     59.00     -0.00      -0.00      -0.00      -0.00        -0.00
  9      -0.00      -0.00     97500.00    -0.00      -0.00     59.00     -0.00      -0.00      -0.00      -0.00        -0.00
 10      -0.00      -0.00     54500.00    -0.00      -0.00     25.00     -0.00      -0.00      -0.00      -0.00        -0.00
 11      -0.00      -0.00     97500.00    -0.00      -0.00     25.00     -0.00      -0.00      -0.00      -0.00        -0.00
 13      -0.00      -0.00     97500.00    -0.00      -0.00     35.00     -0.00      -0.00      -0.00      -0.00        -0.00


 TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE      CO         HC         NO2        CO2        NO         NOX        CO        HC        NO2       CO2        NO        NOX
         LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
        LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

  1      342.80     -0.00      -0.00      -0.00       0.43      -0.00       1.53     -0.00     -0.00     -0.00      0.00     -0.00
  2      495.59     -0.00      -0.00      -0.00       0.33      -0.00       2.68     -0.00     -0.00     -0.00      0.00     -0.00
  3      579.55     -0.00      -0.00      -0.00       0.41      -0.00       4.75     -0.00     -0.00     -0.00      0.00     -0.00
  4      768.79     -0.00      -0.00      -0.00       0.60      -0.00      10.61     -0.00     -0.00     -0.00      0.01     -0.00
  6     1012.19     -0.00      -0.00      -0.00       0.96      -0.00      53.65     -0.00     -0.00     -0.00      0.05     -0.00
  9     1031.18     -0.00      -0.00      -0.00       1.00      -0.00      51.05     -0.00     -0.00     -0.00      0.05     -0.00
 10      487.44     -0.00      -0.00      -0.00       0.37      -0.00      11.21     -0.00     -0.00     -0.00      0.01     -0.00
 11      749.14     -0.00      -0.00      -0.00       0.32      -0.00       6.74     -0.00     -0.00     -0.00      0.00     -0.00
 13      632.60     -0.00      -0.00      -0.00       0.37      -0.00       2.53     -0.00     -0.00     -0.00      0.00     -0.00


 TEST         CO                CO              THC              NO              NO              NO
 MODE                            2                                                2               X
         LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2        1.029           -0.000          -0.000           0.001          -0.000           0.001
   3        0.731           -0.000          -0.000           0.001          -0.000           0.001
   4        0.520           -0.000          -0.000           0.000          -0.000           0.000
   6        3.600           -0.000          -0.000           0.001          -0.000           0.001
   9        0.575           -0.000          -0.000           0.001          -0.000           0.001
  10        0.374           -0.000          -0.000           0.000          -0.000           0.000
  11        0.936           -0.000          -0.000           0.000          -0.000           0.000
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                             LTO CYCLE EMISSIONS

 TEST    TIME IN   MEASURED     FUEL       CO         CO         CO         HC        HC        HC        NO        NO        NO
 MODE     MODE    FUEL FLOW     USED     LB/1K      LB/1K    EMISSION    LB/1K     LB/1K   EMISSION    LB/1K     LB/1K   EMISSION
          MIN.      LB/HR       LBS.    LB FUEL     HOURS      LBS.     LB FUEL    HOURS     LBS.     LB FUEL    HOURS      LBS.

  3      12.00       8.20       1.64     579.55    4752.28     0.950     -0.00     -0.00    -0.000      0.41      3.39    0.0007
  6       0.30      53.00       0.26    1012.19   53645.95     0.268     -0.00     -0.00    -0.000      0.96     50.97    0.0003
  9       5.00      51.00       4.23    1031.18   51060.01     4.234     -0.00     -0.00    -0.000      1.00     50.75    0.0042
 10       6.00      23.00       2.30     487.44   11211.21     1.121     -0.00     -0.00    -0.000      0.37      8.45    0.0008
 11       4.00       9.00       0.60     749.14    6742.24     0.452     -0.00     -0.00    -0.000      0.32      2.64    0.0002

TOTAL FOR CYCLE                 9.041                          7.030                        -0.000                        0.0062

TOTAL FOR CYCLE/LB FUEL                                        0.778                        -0.000                        0.0007
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DATE:   6/18/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  202    ENGINE TYPE AND MODEL:  O-200-A                        SERIAL NUMBER:     2134578

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87               FUEL H/C RATIO:    1.840
OPERATIONAL DATA ***************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:                      START   28.92   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     79.00

     RELATIVE HUMIDITY:                         -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:


                                  TEST            POWER              MEASURED       AIR FLOW     CALCULATED
                                  MODE       SHAFT      PERCENT        FUEL          LB/HR          F/A
                                               HP        RATED         FLOW
                                                                       LB/HR

COLD START + 130 SEC               1          0.0          0            4.00          27.00       0.14815
TAXI-IDLE LOW                      2          2.10         2            5.30          45.00       0.11778
TAXI-IDLE HIGH                     3          7.00         6            6.30          72.00       0.08750
RUN-UP                             4         20.10        20           15.00         162.00       0.09259
TAKE-OFF 100T                      6         89.60        89           52.00         558.00       0.09319
CLIMB-RICH                         8         88.30        88           50.00         558.00       0.08961
CLIMB-LEAN                         9         87.50        87           50.00         558.00       0.08961
APPROACH                          10         28.00        27           23.00         207.00       0.11111
TAXI-IDLE                         11          9.30         9           10.00          63.00       0.15873
HOT START                         13          0.0          0            4.00          18.00       0.22222


 TEST   EXHAUST    EXHAUST       CO         CO         THC       NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
 MODE     GAS        GAS       (DRY)         2        (WET)     (DRY)       2         X
         TEMP     PRESSURE     PPMV       (DRY)       PPMV      PPMV      (DRY)     (DRY)
       DEGREES F    PSIA                PERCENT V                         PPMV      PPMV

  1      -0.00      -0.00    54000.00    -0.00      -0.00     25.00     -0.00     -0.00     -0.00      -0.00       -0.00
  2      -0.00      -0.00    54000.00    -0.00      -0.00     10.00     -0.00     -0.00     -0.00      -0.00       -0.00
  3      -0.00      -0.00    64000.00    -0.00      -0.00     10.00     -0.00     -0.00     -0.00      -0.00       -0.00
  4      -0.00      -0.00    78000.00    -0.00      -0.00     20.00     -0.00     -0.00     -0.00      -0.00       -0.00
  6      -0.00      -0.00    95000.00    -0.00      -0.00     60.00     -0.00     -0.00     -0.00      -0.00       -0.00
  8      -0.00      -0.00    95000.00    -0.00      -0.00     55.00     -0.00     -0.00     -0.00      -0.00       -0.00
  9      -0.00      -0.00    95000.00    -0.00      -0.00     55.00     -0.00     -0.00     -0.00      -0.00       -0.00
 10      -0.00      -0.00    53000.00    -0.00      -0.00     25.00     -0.00     -0.00     -0.00      -0.00       -0.00
 11      -0.00      -0.00    69000.00    -0.00      -0.00     25.00     -0.00     -0.00     -0.00      -0.00       -0.00
 13      -0.00      -0.00    54000.00    -0.00      -0.00     40.00     -0.00     -0.00


 TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
         LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
        LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  1     349.86    -0.00     -0.00     -0.00      0.27     -0.00      1.40     -0.00     -0.00     -0.00      0.00     -0.00
  2     438.72    -0.00     -0.00     -0.00      0.13     -0.00      2.33     -0.00     -0.00     -0.00      0.00     -0.00
  3     681.86    -0.00     -0.00     -0.00      0.17     -0.00      4.30     -0.00     -0.00     -0.00      0.00     -0.00
  4     790.68    -0.00     -0.00     -0.00      0.33     -0.00     11.86     -0.00     -0.00     -0.00      0.00     -0.00
  6     957.53    -0.00     -0.00     -0.00      0.99     -0.00     49.79     -0.00     -0.00     -0.00      0.05     -0.00
  8     991.29    -0.00     -0.00     -0.00      0.94     -0.00     49.56     -0.00     -0.00     -0.00      0.05     -0.00
  9     991.29    -0.00     -0.00     -0.00      0.94     -0.00     49.56     -0.00     -0.00     -0.00      0.05     -0.00
 10     454.98    -0.00     -0.00     -0.00      0.35     -0.00     10.46     -0.00     -0.00     -0.00      0.01     -0.00
 11     416.32    -0.00     -0.00     -0.00      0.25     -0.00      4.1[illegible]   -0.00     -0.00     -0.00      0.00     -0.00
 13     224.83    -0.00     -0.00     -0.00      0.27     -0.00      0.9[illegible]   -0.00     -0.00     -0.00      0.00     -0.00


 TEST         CO               CO             THC              NO              NO              NO
 MODE                           2                                               2               X
          LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
  2          1.107           -0.000          -0.000           0.000          -0.000           0.000
  3          0.614           -0.000          -0.000           0.000          -0.000           0.000
  4          0.590           -0.000          -0.000           0.000          -0.000           0.000
  6          0.556           -0.000          -0.000           0.001          -0.000           0.001
  8          0.561           -0.000          -0.000           0.001          -0.000           0.001
  9          0.566           -0.000          -0.000           0.001          -0.000           0.001
 10          0.374           -0.000          -0.000           0.000          -0.000           0.000
 11          0.448           -0.000          -0.000           0.000          -0.000           0.000
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                               LTO CYCLE EMISSIONS

 TEST    TIME IN   MEASURED    FUEL      CO        CO         CO        HC       HC      HC         NO       NO       NO
 MODE     MODE    FUEL FLOW    USED    LB/1K     LB/1K    EMISSION   LB/1K    LB/1K   EMISSION   LB/1K    LB/1K   EMISSION
          MIN.      LB/HR      LBS.   LB FUEL    HOURS      LBS.    LB FUEL   HOURS     LBS.    LB FUEL   HOURS     LBS.

  3      12.00      6.30       1.26   681.86    4295.69    0.859    -0.00    -0.00    -0.000     0.17     1.10    0.0002
  6       0.30     52.00       0.26   957.53   49791.52    0.249    -0.00    -0.00    -0.000     0.99    51.65    0.0003
  9       5.00     50.00       4.15   991.29   49564.45    4.114    -0.00    -0.00    -0.000     0.94    47.13    0.0039
 10       6.00     23.00       2.30   454.98   10464.45    1.046    -0.00    -0.00    -0.000     0.35     8.11    0.0008
 11       4.00     10.00       0.67   416.32    4163.23    0.279    -0.00    -0.00    -0.000     0.25     2.48    0.0002

                                                                                -0.000                     0.0054
TOTAL FOR CYCLE                    8.640                           6.547

                                                                                -0.000                     0.0006
TOTAL FOR CYCLE/LB FUEL                                            0.759
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DATE:   6/21/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL
ENGINE DATA *******************************************************************************************
     CAL ID NUMBER:  203    ENGINE TYPE AND MODEL:  O-200-A                     SERIAL NUMBER:     213504A

                            RATED HORSEPOWER:   100.

      ENGINE TOTAL TIME:      -0. HRS

      FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840
*******************************************************************************************************
OPERATIONAL DATA ******************************************************************************************
      INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

      ATMOSPHERIC PRESSURE:              START   28.91   FINISH   -0.00

      INLET AIR HUMIDITY, GRN H2O/LB AIR:    63.00

      RELATIVE HUMIDITY:                    -0.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

      SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

 NUMBER OF TESTS:   9

 COMMENTS:


                               TEST             POWER              MEASURED      AIR FLOW    CALCULATED
                               MODE      SHAFT        PERCENT        FUEL          LB/HR        F/A
                                          HP           RATED         FLOW
                                                                     LB/HR

 COLD START + 130 SEC            1        0.0           0            3.50         27.00       0.12963
 TAXI-IDLE LOW                   2        2.80          2            4.60         40.50       0.11358
 TAXI-IDLE HIGH                  3        8.00          7            8.20         76.50       0.10719
 RUN-UP                          4       20.30         20           15.50        157.50       0.09841
 TAKE-OFF 100%                   6       91.30         91           53.00        576.00       0.09201
 CLIMB-LEAN                      9       91.10         91           51.00        567.00       0.08995
 APPROACH                       10       29.30         29           22.00        207.00       0.10628
 TAXI-IDLE                      11        7.40          7            7.50         67.50       0.11111
 HOT START                      13        0.0           0            3.50         22.50       0.15556

                                                                       NO        NO     ALDEHYDES   SMOKE    PARTICULATES
  TEST   EXHAUST    EXHAUST      CO        CO       THC        NO       2         X
  MODE     GAS        GAS       (DRY)       2      (WET)     (DRY)    (DRY)     (DRY)
           TEMP    PRESSURE     PPMV      (DRY)     PPMV      PPMV     PPMV      PPMV
        DEGREES F    PSIA             PERCENT V

   1      -0.00     -0.00    50000.00   -0.00   25000.00    25.00    -0.00     -0.00     -0.00     -0.00      -0.00
   2      -0.00     -0.00    64000.00   -0.00   27500.00    10.00    -0.00     -0.00     -0.00     -0.00      -0.00
   3      -0.00     -0.00    73500.00   -0.00   17500.00    35.00    -0.00     -0.00     -0.00     -0.00      -0.00
   4      -0.00     -0.00    87500.00   -0.00    4000.00    35.00    -0.00     -0.00     -0.00     -0.00      -0.00
   6      -0.00     -0.00    93000.00   -0.00      -0.00   115.00    -0.00     -0.00     -0.00     -0.00      -0.00
   9      -0.00     -0.00    87500.00   -0.00      -0.00   150.00    -0.00     -0.00     -0.00     -0.00      -0.00
  10      -0.00     -0.00    69000.00   -0.00      -0.00    25.00    -0.00     -0.00     -0.00     -0.00      -0.00
  11      -0.00     -0.00    54000.00   -0.00      -0.00    25.00    -0.00     -0.00     -0.00     -0.00      -0.00
  13      -0.00     -0.00    54000.00   -0.00      -0.00    40.00    -0.00     -0.00     -0.00     -0.00      -0.00

                                                                                                   MASS EMI  MASS EMI
                                                           MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI     NO       NOX
  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI    NOX        CO        HC       NO2       CO2      LB/HR     LB/HR
  MODE      CO        HC       NO2       CO2        NO      LB/1K     LB/HR     LB/HR     LB/HR     LB/HR
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K    LB FUEL
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1     371.66    138.64    -0.00     -0.00      0.31     -0.00      1.30      0.49     -0.00     -0.00      0.00     -0.00
   2     540.20    167.84    -0.00     -0.00      0.14     -0.00      2.48      0.77     -0.00     -0.00      0.00     -0.00
   3     654.89    111.36    -0.00     -0.00      0.51     -0.00      5.37      0.91     -0.00     -0.00      0.00     -0.00
   4     843.01     27.06    -0.00     -0.00      0.55     -0.00     13.07      0.42     -0.00     -0.00      0.01     -0.00
   6     951.52     -0.00    -0.00     -0.00      1.93     -0.00     50.43     -0.00     -0.00     -0.00      0.10     -0.00
   9     913.37     -0.00    -0.00     -0.00      2.57     -0.00     46.58     -0.00     -0.00     -0.00      0.13     -0.00
  10     619.66     -0.00    -0.00     -0.00      0.37     -0.00     13.63     -0.00     -0.00     -0.00      0.01     -0.00
  11     465.30     -0.00    -0.00     -0.00      0.35     -0.00      3.49     -0.00     -0.00     -0.00      0.00     -0.00
  13     334.01     -0.00    -0.00     -0.00      0.41     -0.00      1.17     -0.00     -0.00     -0.00      0.00     -0.00

                                                                            NO               NO
                                 CO            THC            NO            2                X
  TEST        CO                  2                                     LB/1K HP-HR      LB/1K HP-HR
  MODE                       LB/1K HP-HR    LB/1K HP-HR    LB/1K HP-HR
         LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2        0.887          -0.000          0.276          0.000          -0.000           0.000
   3        0.671          -0.000          0.114          0.001          -0.000           0.001
   4        0.644          -0.000          0.021          0.000          -0.000           0.000
   6        0.552          -0.000         -0.000          0.001          -0.000           0.001
   9        0.511          -0.000         -0.000          0.001          -0.000           0.001
  10        0.465          -0.000         -0.000          0.000          -0.000           0.000
  11        0.472          -0.000         -0.000          0.000          -0.000           0.000
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                             LTO CYCLE EMISSIONS
                                                                                                          NO        NO
                                                  CO         CO        CO        HC        HC       HC       NO       LB/1K    EMISSION
  TEST   TIME IN   MEASURED      FUEL          LB/1K      LB/1K    EMISSION    LB/1K     LB/1K  EMISSION   LB/1K     HOURS      LBS.
  MODE     MODE    FUEL FLOW     USED         LB FUEL     HOURS      LBS.     LB FUEL    HOURS     LBS.   LB FUEL
           MIN.      LB/HR       LBS.

   3      12.00       8.20       1.64         654.89    5370.07     1.074    111.36    913.12    0.183     0.51       4.20    0.0008
   6       0.30      53.00       0.26         951.52   50430.65     0.252     -0.00     -0.00   -0.000     1.93     102.43    0.0005
   9       5.00      51.00       4.23         913.37   46581.89     3.866     -0.00     -0.00   -0.000     2.57     131.17    0.0109
  10       6.00      22.00       2.20         619.66   13632.48     1.363     -0.00     -0.00   -0.000     0.37       8.11    0.0008
  11       4.00       7.50       0.50         465.30    3489.76     0.234     -0.00     -0.00   -0.000     0.35       2.65    0.0002

 TOTAL FOR CYCLE                 8.840                           6.790                         -0.000                       0.0132

 TOTAL FOR CYCLE/LB FUEL                                         0.768                         -0.000                       0.0015
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DATE:   6/21/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  204    ENGINE TYPE AND MODEL:  O-200-A                    SERIAL NUMBER:      2135048

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA *************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.91   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     65.00

     RELATIVE HUMIDITY:                      -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:



                               TEST            POWER              MEASURED      AIR FLOW     CALCULATED
                               MODE       SHAFT       PERCENT       FUEL         LB/HR          F/A
                                           HP          RATED        FLOW
                                                                    LB/HR

COLD START + 130 SEC             1         0.0           0           3.50         27.00        0.12963
TAXI-IDLE LOW                    2         2.00          1           4.30         36.00        0.11944
TAXI-IDLE HIGH                   3         6.80          6           7.60         67.50        0.11259
RUN-UP                           4        19.60         19          13.20        153.00        0.08627
TAKE-OFF 100%                    6        91.10         91          53.00        571.50        0.09274
CLIMB-RICH                       8        91.10         91          53.00        571.50        0.09274
CLIMB-LEAN                       9        90.30         90          51.00        567.00        0.08995
APPROACH                        10        28.80         28          22.00        202.50        0.10864
TAXI-IDLE                       11         7.00          6           6.50         67.50        0.09630
HOT START                       13         0.0           0           3.50         22.50        0.15556


  TEST   EXHAUST    EXHAUST       CO         CO        THC        NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS        GAS        (DRY)        2        (WET)     (DRY)       2         X
           TEMP     PRESSURE     PPMV       (DRY)      PPMV      PPMV      (DRY)     (DRY)
        DEGREES F     PSIA               PERCENT V                         PPMV      PPMV

    1    -0.00      -0.00     82500.00    -0.00      -0.00      25.00     -0.00     -0.00     -0.00       -0.00        -0.00
    2    -0.00      -0.00     74000.00    -0.00      -0.00      10.00     -0.00     -0.00     -0.00       -0.00        -0.00
    3    -0.00      -0.00     53500.00    -0.00      -0.00      25.00     -0.00     -0.00     -0.00       -0.00        -0.00
    4    -0.00      -0.00      6000.00    -0.00      -0.00     130.00     -0.00     -0.00     -0.00       -0.00        -0.00
    6    -0.00      -0.00     64000.00    -0.00      -0.00      90.00     -0.00     -0.00     -0.00       -0.00        -0.00
    8    -0.00      -0.00     64000.00    -0.00      -0.00      90.00     -0.00     -0.00     -0.00       -0.00        -0.00
    9    -0.00      -0.00     54000.00    -0.00      -0.00     130.00     -0.00     -0.00     -0.00       -0.00        -0.00
   10    -0.00      -0.00     85000.00    -0.00      -0.00      20.00     -0.00     -0.00     -0.00       -0.00        -0.00
   11    -0.00      -0.00     49500.00    -0.00      -0.00      30.00     -0.00     -0.00     -0.00       -0.00        -0.00
   13    -0.00      -0.00     78000.00    -0.00      -0.00      40.00     -0.00     -0.00     -0.00       -0.00        -0.00


  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    1    612.95    -0.00     -0.00     -0.00      0.31     -0.00      2.15     -0.00     -0.00     -0.00      0.00     -0.00
    2    595.16    -0.00     -0.00     -0.00      0.13     -0.00      2.56     -0.00     -0.00     -0.00      0.00     -0.00
    3    455.08    -0.00     -0.00     -0.00      0.35     -0.00      3.46     -0.00     -0.00     -0.00      0.00     -0.00
    4     64.92    -0.00     -0.00     -0.00      2.31     -0.00      0.86     -0.00     -0.00     -0.00      0.03     -0.00
    6    649.97    -0.00     -0.00     -0.00      1.50     -0.00     34.45     -0.00     -0.00     -0.00      0.08     -0.00
    8    649.97    -0.00     -0.00     -0.00      1.50     -0.00     34.45     -0.00     -0.00     -0.00      0.08     -0.00
    9    563.42    -0.00     -0.00     -0.00      2.23     -0.00     28.73     -0.00     -0.00     -0.00      0.11     -0.00
   10    747.60    -0.00     -0.00     -0.00      0.29     -0.00     16.45     -0.00     -0.00     -0.00      0.01     -0.00
   11    486.10    -0.00     -0.00     -0.00      0.48     -0.00      3.16     -0.00     -0.00     -0.00      0.00     -0.00
   13    482.23    -0.00     -0.00     -0.00      0.41     -0.00      1.69     -0.00     -0.00     -0.00      0.00     -0.00


  TEST          CO                CO              THC               NO              NO              NO
  MODE                             2                                                 2               X
           LB/1K HP-HR       LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
    2        1.290            -0.000           -0.000            0.000           -0.000           0.000
    3        0.509            -0.000           -0.000            0.000           -0.000           0.000
    4        0.044            -0.000           -0.000            0.002           -0.000           0.002
    6        0.378            -0.000           -0.000            0.001           -0.000           0.001
    8        0.378            -0.000           -0.000            0.001           -0.000           0.001
    9        0.318            -0.000           -0.000            0.001           -0.000           0.001
   10        0.571            -0.000           -0.000            0.000           -0.000           0.000
   11        0.451            -0.000           -0.000            0.000           -0.000           0.000
*****HORSEPOWER-HP BASIS NOT CALCULABLE****


                                                    LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL       CO         CO         CO        HC       HC        HC        NO        NO       NO
  MODE     MODE     FUEL FLOW   USED     LB/1K      LB/1K    EMISSION   LB/1K    LB/1K   EMISSION   LB/1K     LB/1K   EMISSION
           MIN.      LB/HR      LBS.    LB FUEL     HOURS      LBS.    LB FUEL   HOURS     LBS.    LB FUEL    HOURS     LBS.

    3     12.00       7.60      1.52    455.08    3458.64     0.692     -0.00    -0.00    -0.000     0.35      2.65    0.0005
    6      0.30      53.00      0.26    649.97   34448.53     0.172     -0.00    -0.00    -0.000     1.50     79.57    0.0004
    9      5.00      51.00      4.23    563.42   28734.33     2.385     -0.00    -0.00    -0.000     2.23    113.67    0.0094
   10      6.00      22.00      2.20    747.60   16447.10     1.645     -0.00    -0.00    -0.000     0.29      6.36    0.0006
   11      4.00       6.50      0.44    486.10    3159.68     0.212     -0.00    -0.00    -0.000     0.48      3.15    0.0002

TOTAL FOR CYCLE                 8.653                         5.105                       -0.000                      0.0112

TOTAL FOR CYCLE/LB FUEL                                       0.590                       -0.000                      0.0013
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DATE:   6/22/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:  205    ENGINE TYPE AND MODEL:  O-200-A                 SERIAL NUMBER:      213483

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87             FUEL H/C RATIO:    1.840
OPERATIONAL DATA ***************************************************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

      ATMOSPHERIC PRESSURE:              START   28.93   FINISH   -0.00

      INLET AIR HUMIDITY, GRN H2O/LB AIR:    64.00

      RELATIVE HUMIDITY:                     -0.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

      SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

 NUMBER OF TESTS:   9

 COMMENTS:


                               TEST           POWER               MEASURED     AIR FLOW    CALCULATED
                               MODE      SHAFT       PERCENT        FUEL        LB/HR         F/A
                                          HP          RATED         FLOW
                                                                    LB/HR

 COLD START + 130 SEC            1        0.0           0           3.50        22.50       0.15556
 TAXI-IDLE LOW                   2        2.70          2           4.00        45.00       0.08889
 TAXI-IDLE HIGH                  3        7.50          7           7.50        81.00       0.09259
 RUN-UP                          4       20.90         20          12.60       171.00       0.07368
 TAKE-OFF 100%                   6       93.30         93          52.00       576.00       0.09028
 CLIMB-LEAN                      9       92.10         92          51.00       567.00       0.08995
 APPROACH                       10       29.00         28          21.50       207.00       0.10386
 TAXI-IDLE                      11        7.10          7           6.30        63.00       0.10000
 HOT START                      13        0.0           0           3.50        22.50       0.15556

  TEST   EXHAUST    EXHAUST      CO         CO         THC        NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
  MODE     GAS        GAS       (DRY)        2        (WET)      (DRY)       2         X
           TEMP     PRESSURE    PPMV       (DRY)      PPMV       PPMV      (DRY)     (DRY)
        DEGREES F     PSIA              PERCENT V                          PPMV      PPMV

   1      -0.00      -0.00    10000.00    -0.00   20000.00     42.00     -0.00     -0.00     -0.00      -0.00      -0.00
   2      -0.00      -0.00    61500.00    -0.00    4000.00     42.00     -0.00     -0.00     -0.00      -0.00      -0.00
   3      -0.00      -0.00    59000.00    -0.00    3100.00     70.00     -0.00     -0.00     -0.00      -0.00      -0.00
   4      -0.00      -0.00     5000.00    -0.00     500.00    445.00     -0.00     -0.00     -0.00      -0.00      -0.00
   6      -0.00      -0.00    88000.00    -0.00    1250.00    225.00     -0.00     -0.00     -0.00      -0.00      -0.00
   9      -0.00      -0.00    86000.00    -0.00    2250.00    260.00     -0.00     -0.00     -0.00      -0.00      -0.00
  10      -0.00      -0.00    53000.00    -0.00    1500.00     40.00     -0.00     -0.00     -0.00      -0.00      -0.00
  11      -0.00      -0.00    61500.00    -0.00    3000.00     65.00     -0.00     -0.00     -0.00      -0.00      -0.00
  13      -0.00      -0.00    74000.00    -0.00   25000.00     42.00     -0.00     -0.00     -0.00      -0.00      -0.00

  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1      61.84     97.10     -0.00     -0.00      0.43     -0.00      0.22      0.34     -0.00     -0.00      0.00     -0.00
   2     648.52     29.08     -0.00     -0.00      0.73     -0.00      2.59      0.12     -0.00     -0.00      0.00     -0.00
   3     600.17     21.90     -0.00     -0.00      1.17     -0.00      4.50      0.16     -0.00     -0.00      0.01     -0.00
   4      61.85      4.14     -0.00     -0.00      9.04     -0.00      0.78      0.05     -0.00     -0.00      0.11     -0.00
   6     915.42      8.99     -0.00     -0.00      3.84     -0.00     47.60      0.47     -0.00     -0.00      0.20     -0.00
   9     897.50     16.22     -0.00     -0.00      4.46     -0.00     45.77      0.83     -0.00     -0.00      0.23     -0.00
  10     486.04      9.76     -0.00     -0.00      0.60     -0.00     10.45      0.21     -0.00     -0.00      0.01     -0.00
  11     583.86     20.06     -0.00     -0.00      1.01     -0.00      3.68      0.13     -0.00     -0.00      0.01     -0.00
  13     457.61    121.37     -0.00     -0.00      0.43     -0.00      1.60      0.42     -0.00     -0.00      0.00     -0.00

  TEST        CO              CO              THC              NO              NO              NO
  MODE                         2                                                2               X
         LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2        0.961          -0.000           0.043           0.001          -0.000           0.001
   3        0.600          -0.000           0.022           0.001          -0.000           0.001
   4        0.037          -0.000           0.002           0.005          -0.000           0.005
   6        0.510          -0.000           0.005           0.002          -0.000           0.002
   9        0.497          -0.000           0.009           0.002          -0.000           0.002
  10        0.360          -0.000           0.007           0.000          -0.000           0.000
  11        0.518          -0.000           0.018           0.001          -0.000           0.001
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                          LTO CYCLE EMISSIONS

  TEST   TIME IN   MEASURED    FUEL      CO         CO         CO         HC        HC        HC        NO        NO        NO
  MODE    MODE     FUEL FLOW   USED     LB/1K      LB/1K    EMISSION    LB/1K     LB/1K   EMISSION    LB/1K     LB/1K   EMISSION
          MIN.      LB/HR      LBS.    LB FUEL     HOURS      LBS.     LB FUEL    HOURS     LBS.     LB FUEL    HOURS      LBS.

   3     12.00       7.50      1.50    600.17    4501.27     0.900      21.90    164.23     0.033      1.17      8.77    0.0018
   6      0.30      52.00      0.26    915.42   47601.64     0.238       8.99    467.43     0.002      3.84    199.91    0.0010
   9      5.00      51.00      4.23    897.50   45772.69     3.799      16.22    827.34     0.069      4.46    227.30    0.0189
  10      6.00      21.50      2.15    486.04   10449.95     1.045       9.76    209.91     0.021      0.60     12.95    0.0013
  11      4.00       6.30      0.42    583.86    3678.31     0.246      20.06    126.40     0.008      1.01      6.39    0.0004

 TOTAL FOR CYCLE                   8.565                     6.229                          0.133                        0.0233

 TOTAL FOR CYCLE/LB FUEL                                     0.727                          0.016                        0.0027
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DATE:   6/23/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA *****************************************************************************************************

     CAL ID NUMBER:  206    ENGINE TYPE AND MODEL:  O-200-A                     SERIAL NUMBER:     213500A

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.71   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    83.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   9

COMMENTS:


                             TEST            POWER              MEASURED      AIR FLOW    CALCULATED
                             MODE      SHAFT       PERCENT        FUEL         LB/HR         F/A
                                        HP          RATED         FLOW
                                                                  LB/HR

COLD START + 130 SEC           1        0.0          0             3.50         22.50       0.15556
TAXI-IDLE LOW                  2        2.10         2             4.00         45.00       0.08889
TAXI-IDLE HIGH                 3        6.60         6            10.50         81.00       0.12963
RUN-UP                         4       18.60        18            15.70        153.00       0.10261
TAKE-OFF 100%                  6       89.10        89            51.50        562.50       0.09156
CLIMB-LEAN                     9       88.80        88            51.00        558.00       0.09140
APPROACH                      10       28.30        28            21.50        207.00       0.10386
TAXI-IDLE                     11        6.60         6            11.80         67.50       0.17481
HOT START                     13        0.0          0             3.50         27.00       0.12963


 TEST   EXHAUST    EXHAUST      CO         CO        THC        NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
 MODE     GAS        GAS       (DRY)        2       (WET)      (DRY)       2         X
         TEMP     PRESSURE     PPMV      (DRY)      PPMV       PPMV     (DRY)     (DRY)
       DEGREES F    PSIA               PERCENT V                        PPMV      PPMV

   1     -0.00      -0.00    35000.00    -0.00   32500.00     55.00     -0.00     -0.00     -0.00       -0.00       -0.00
   2     -0.00      -0.00    64000.00    -0.00    3500.00     60.00     -0.00     -0.00     -0.00       -0.00       -0.00
   3     -0.00      -0.00    97500.00    -0.00    7000.00     45.00     -0.00     -0.00     -0.00       -0.00       -0.00
   4     -0.00      -0.00    61500.00    -0.00    1550.00     85.00     -0.00     -0.00     -0.00       -0.00       -0.00
   6     -0.00      -0.00    82500.00    -0.00    2100.00    175.00     -0.00     -0.00     -0.00       -0.00       -0.00
   9     -0.00      -0.00    86000.00    -0.00    1750.00    195.00     -0.00     -0.00     -0.00       -0.00       -0.00
  10     -0.00      -0.00    52000.00    -0.00     900.00     70.00     -0.00     -0.00     -0.00       -0.00       -0.00
  11     -0.00      -0.00   112000.00    -0.00     750.00     35.00     -0.00     -0.00     -0.00       -0.00       -0.00
  13     -0.00      -0.00    54000.00    -0.00   35000.00     60.00     -0.00     -0.00     -0.00       -0.00       -0.00


 TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1     215.46    157.78     -0.00     -0.00      0.56     -0.00      0.75      0.55     -0.00     -0.00      0.00     -0.00
   2     671.91     25.45     -0.00     -0.00      1.03     -0.00      2.69      0.10     -0.00     -0.00      0.00     -0.00
   3     721.32     38.82     -0.00     -0.00      0.55     -0.00      7.57      0.41     -0.00     -0.00      0.01     -0.00
   4     567.77     10.18     -0.00     -0.00      1.29     -0.00      8.91      0.16     -0.00     -0.00      0.02     -0.00
   6     843.90     14.95     -0.00     -0.00      2.94     -0.00     43.46      0.77     -0.00     -0.00      0.15     -0.00
   9     881.04     12.48     -0.00     -0.00      3.28     -0.00     44.93      0.64     -0.00     -0.00      0.17     -0.00
  10     474.76      5.86     -0.00     -0.00      1.05     -0.00     10.21      0.13     -0.00     -0.00      0.02     -0.00
  11     609.52      3.34     -0.00     -0.00      0.31     -0.00      7.19      0.04     -0.00     -0.00      0.00     -0.00
  13     399.50    194.09     -0.00     -0.00      0.73     -0.00      1.40      0.68     -0.00     -0.00      0.00     -0.00


 TEST          CO               CO              THC               NO               NO               NO
 MODE                            2                                                  2                X
          LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2        1.280           -0.000            0.048            0.002           -0.000            0.002
   3        1.148           -0.000            0.062            0.001           -0.000            0.001
   4        0.479           -0.000            0.009            0.001           -0.000            0.001
   6        0.488           -0.000            0.009            0.002           -0.000            0.002
   9        0.506           -0.000            0.007            0.002           -0.000            0.002
  10        0.361           -0.000            0.004            0.001           -0.000            0.001
  11        1.090           -0.000            0.006            0.001           -0.000            0.001
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                LTO CYCLE EMISSIONS

 TEST   TIME IN   MEASURED    FUEL      CO        CO         CO        HC        HC        HC        NO        NO        NO
 MODE    MODE    FUEL FLOW    USED     LB/1K     LB/1K    EMISSION   LB/1K     LB/1K   EMISSION   LB/1K     LB/1K   EMISSION
         MIN.      LB/HR      LBS.    LB FUEL    HOURS      LBS.    LB FUEL    HOURS     LBS.    LB FUEL    HOURS     LBS.

   3     12.00     10.50      2.10    721.32    7573.91    1.515     38.82    407.59    0.082     0.55      5.74    0.0011
   6      0.30     51.50      0.26    843.90   43460.84    0.217     14.95    770.06    0.004     2.94    151.43    0.0008
   9      5.00     51.00      4.23    881.04   44933.18    3.729     12.48    636.26    0.053     3.28    167.35    0.0139
  10      6.00     21.50      2.15    474.76   10207.40    1.021      5.86    125.94    0.013     1.05     22.57    0.0023
  11      4.00     11.80      0.79    609.52    7192.29    0.482      3.34     39.45    0.003     0.31      3.69    0.0002
                                                                                      0.153                        0.0183
TOTAL FOR CYCLE               9.531                        6.964

TOTAL FOR CYCLE/LB FUEL                                    0.731                      0.016                        0.0019
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DATE:   6/24/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:  207    ENGINE TYPE AND MODEL:  O-200-A                  SERIAL NUMBER:      2135008

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87               FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.68   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    91.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   9

COMMENTS:


                                 TEST               POWER                MEASURED      AIR FLOW     CALCULATED
                                 MODE        SHAFT          PERCENT        FUEL         LB/HR          F/A
                                              HP            RATED          FLOW
                                                                           LB/HR

COLD START + 130 SEC              1           0.0             0             3.50        31.50        0.11111
TAXI-IDLE LOW                     2           2.00            1             4.50        45.00        0.10000
TAXI-IDLE HIGH                    3           7.00            6             9.00        85.50        0.10526
RUN-UP                            4          19.10           19            16.70       166.50        0.10030
TAKE-OFF 100%                     6          88.60           88            52.50       580.50        0.09044
CLIMB-LEAN                        9          88.90           88            51.00       576.00        0.08854
APPROACH                         10          28.70           28            22.50       216.00        0.10417
TAXI-IDLE                        11           7.00            6            10.00        67.50        0.14815
HOT START                        13           0.0             0             3.50        27.00        0.12963


  TEST   EXHAUST     EXHAUST       CO          CO         THC        NO        NO         NO      ALDEHYDES    SMOKE     PARTICULATES
  MODE     GAS         GAS        (DRY)         2        (WET)     (DRY)       2          X
          TEMP      PRESSURE      PPMV       (DRY)       PPMV      PPMV      (DRY)      (DRY)
       DEGREES F      PSIA                 PERCENT V                         PPMV       PPMV

   1     -0.00       -0.00      86000.00    -0.00   25000.00     50.00     -0.00      -0.00      -0.00      -0.00         -0.00
   2     -0.00       -0.00      78000.00    -0.00    5000.00     45.00     -0.00      -0.00      -0.00      -0.00         -0.00
   3     -0.00       -0.00      92500.00    -0.00    8500.00     50.00     -0.00      -0.00      -0.00      -0.00         -0.00
   4     -0.00       -0.00      64000.00    -0.00    2200.00     65.00     -0.00      -0.00      -0.00      -0.00         -0.00
   6     -0.00       -0.00      86000.00    -0.00    2600.00    150.00     -0.00      -0.00      -0.00      -0.00         -0.00
   9     -0.00       -0.00      83000.00    -0.00    2000.00    180.00     -0.00      -0.00      -0.00      -0.00         -0.00
  10     -0.00       -0.00      52000.00    -0.00    2100.00     55.00     -0.00      -0.00      -0.00      -0.00         -0.00
  11     -0.00       -0.00     107000.00    -0.00    4000.00     42.00     -0.00      -0.00      -0.00      -0.00         -0.00
  13     -0.00       -0.00      52000.00    -0.00   35000.00     55.00     -0.00      -0.00      -0.00      -0.00         -0.00


  TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1      736.19     155.02      -0.00      -0.00       0.70      -0.00       2.58       0.54      -0.00      -0.00       0.00      -0.00
   2      735.86      33.44      -0.00      -0.00       0.70      -0.00       3.31       0.15      -0.00      -0.00       0.00      -0.00
   3      832.65      54.80      -0.00      -0.00       0.74      -0.00       7.49       0.49      -0.00      -0.00       0.01      -0.00
   4      602.14      14.68      -0.00      -0.00       1.00      -0.00      10.06       0.25      -0.00      -0.00       0.02      -0.00
   6      887.63      18.67      -0.00      -0.00       2.54      -0.00      46.60       0.98      -0.00      -0.00       0.13      -0.00
   9      872.76      14.58      -0.00      -0.00       3.11      -0.00      44.51       0.74      -0.00      -0.00       0.16      -0.00
  10      472.62      13.64      -0.00      -0.00       0.82      -0.00      10.63       0.31      -0.00      -0.00       0.02      -0.00
  11      691.27      20.12      -0.00      -0.00       0.45      -0.00       6.91       0.20      -0.00      -0.00       0.00      -0.00
  13      383.98     194.09      -0.00      -0.00       0.67      -0.00       1.34       0.68      -0.00      -0.00       0.00      -0.00


  TEST          CO                  CO                THC                NO                 NO                 NO
  MODE                               2                                                       2                  X
           LB/1K HP-HR         LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
    2         1.656              -0.000             0.075              0.002             -0.000              0.002
    3         1.071              -0.000             0.070              0.001             -0.000              0.001
    4         0.526              -0.000             0.013              0.001             -0.000              0.001
    6         0.526              -0.000             0.011              0.002             -0.000              0.002
    9         0.501              -0.000             0.008              0.002             -0.000              0.002
   10         0.371              -0.000             0.011              0.001             -0.000              0.001
   11         0.988              -0.000             0.029              0.001             -0.000              0.001
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                               LTO CYCLE EMISSIONS

  TEST    TIME IN    MEASURED     FUEL       CO         CO          CO         HC        HC         HC         NO        NO         NO
  MODE     MODE     FUEL FLOW     USED      LB/1K      LB/1K     EMISSION    LB/1K     LB/1K     EMISSION    LB/1K     LB/1K     EMISSION
           MIN.       LB/HR       LBS.     LB FUEL     HOURS       LBS.     LB FUEL    HOURS       LBS.     LB FUEL    HOURS       LBS.

    3     12.00        9.00       1.80     832.65     7493.83     1.497      54.80     493.17     0.099      0.74       6.65     0.0013
    6      0.30       52.50       0.26     887.63    46600.59     0.233      18.67     980.38     0.005      2.54     133.51     0.0007
    9      5.00       51.00       4.23     872.76    44510.95     3.694      14.58     743.62     0.062      3.11     158.56     0.0132
   10      6.00       22.50       2.25     472.62    10633.89     1.063      13.64     306.90     0.031      0.82      18.47     0.0018
   11      4.00       10.00       0.67     691.27     6912.68     0.463      20.12     201.24     0.013      0.45       4.46     0.0003

TOTAL FOR CYCLE                   9.215                           6.953                          0.209                          0.0173

TOTAL FOR CYCLE/LB FUEL                                           0.754                          0.023                          0.0019
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DATE:  6/24/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ******************************************************************************************

     CAL ID NUMBER:  208    ENGINE TYPE AND MODEL:  O-200-A                    SERIAL NUMBER:     213500L

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87             FUEL H/C RATIO:     1.840

OPERATIONAL DATA *************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.68   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    91.00

     RELATIVE HUMIDITY:                    -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   9

COMMENTS:


                            TEST              POWER                 MEASURED      AIR FLOW    CALCULATED
                            MODE        SHAFT       PERCENT           FUEL         LB/HR          F/A
                                         HP          RATED            FLOW
                                                                      LB/HR

COLD START + 130 SEC          1          0.0           0              3.50         27.00        0.12963
TAXI-IDLE LOW                 2          2.10          2              4.00         40.50        0.09677
TAXI-IDLE HIGH                3          6.60          6              9.00         76.50        0.11765
RUN-UP                        4         19.60         19             13.30        144.00        0.09236
TAKE-OFF 100%                 6         89.00         88             52.30        562.50        0.09298
CLIMB-LEAN                    9         88.50         88             51.00        562.50        0.09067
APPROACH                     10         28.50         28             22.50        211.50        0.10638
TAXI-IDLE                    11          6.60          6             10.50         72.00        0.14583
HOT START                    13          0.0           0              3.60         27.00        0.13333


  TEST   EXHAUST    EXHAUST      CO         CO        THC        NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS        GAS       (DRY)        2       (WET)     (DRY)        2         X
          TEMP     PRESSURE     PPMV       (DRY)      PPMV      PPMV      (DRY)     (DRY)
        DEGREES F    PSIA               PERCENT V                          PPMV      PPMV

    1     -0.00      -0.00     76000.00    -0.00  39000.00     50.00     -0.00     -0.00     -0.00       -0.00       -0.00
    2     -0.00      -0.00     74000.00    -0.00   5000.00     42.00     -0.00     -0.00     -0.00       -0.00       -0.00
    3     -0.00      -0.00     97500.00    -0.00   9000.00     42.00     -0.00     -0.00     -0.00       -0.00       -0.00
    4     -0.00      -0.00     64000.00    -0.00   2100.00     55.00     -0.00     -0.00     -0.00       -0.00       -0.00
    6     -0.00      -0.00     86000.00    -0.00   2800.00    185.00     -0.00     -0.00     -0.00       -0.00       -0.00
    9     -0.00      -0.00     86000.00    -0.00   2000.00    155.00     -0.00     -0.00     -0.00       -0.00       -0.00
   10     -0.00      -0.00     52000.00    -0.00   2000.00     50.00     -0.00     -0.00     -0.00       -0.00       -0.00
   11     -0.00      -0.00    102000.00    -0.00   9500.00     35.00     -0.00     -0.00     -0.00       -0.00       -0.00
   13     -0.00      -0.00     54000.00    -0.00  42000.00     45.00     -0.00     -0.00     -0.00       -0.00       -0.00


  TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
           LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
          LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    1     561.20    216.27     -0.00     -0.00      0.61     -0.00      1.96      0.76     -0.00     -0.00      0.00     -0.00
    2     706.03     33.74     -0.00     -0.00      0.66     -0.00      2.82      0.13     -0.00     -0.00      0.00     -0.00
    3     790.75     53.55     -0.00     -0.00      0.56     -0.00      7.12      0.48     -0.00     -0.00      0.01     -0.00
    4     648.40     14.86     -0.00     -0.00      0.92     -0.00      8.62      0.20     -0.00     -0.00      0.01     -0.00
    6     866.16     19.72     -0.00     -0.00      3.06     -0.00     45.30      1.03     -0.00     -0.00      0.16     -0.00
    9     885.67     14.34     -0.00     -0.00      2.62     -0.00     45.17      0.73     -0.00     -0.00      0.13     -0.00
   10     463.53     12.80     -0.00     -0.00      0.73     -0.00     10.43      0.29     -0.00     -0.00      0.02     -0.00
   11     669.62     48.35     -0.00     -0.00      0.38     -0.00      7.03      0.51     -0.00     -0.00      0.00     -0.00
   13     387.84    228.18     -0.00     -0.00      0.53     -0.00      1.40      0.82     -0.00     -0.00      0.00     -0.00


  TEST          CO                CO                THC                NO                NO                NO
  MODE                             2                                                        2                 X
           LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
    2          1.345            -0.000             0.064             0.001            -0.000             0.001
    3          1.078            -0.000             0.073             0.001            -0.000             0.001
    4          0.440            -0.000             0.010             0.001            -0.000             0.001
    6          0.509            -0.000             0.012             0.002            -0.000             0.002
    9          0.510            -0.000             0.008             0.002            -0.000             0.002
   10          0.366            -0.000             0.010             0.001            -0.000             0.001
   11          1.065            -0.000             0.077             0.001            -0.000             0.001
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                   LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL       CO         CO         CO         HC        HC         HC         NO        NO         NO
  MODE     MODE    FUEL FLOW    USED      LB/1K      LB/1K    EMISSION     LB/1K     LB/1K    EMISSION     LB/1K     LB/1K    EMISSION
           MIN.      LB/HR      LBS.     LB FUEL     HOURS      LBS.      LB FUEL    HOURS      LBS.      LB FUEL    HOURS      LBS.

    3     12.00       9.00      1.80     790.75    7116.79     1.423      53.55     481.95     0.096      0.56       5.04    0.0010
    6      0.30      52.30      0.26     866.16   45300.20     0.227      19.72    1031.39     0.005      3.06     160.06    0.0008
    9      5.00      51.00      4.23     885.67   45169.09     3.749      14.34     731.29     0.061      2.62     133.72    0.0111
   10      6.00      22.50      2.25     463.53   10429.46     1.043      12.80     287.90     0.029      0.73      16.47    0.0016
   11      4.00      10.50      0.70     669.62    7031.06     0.471      48.35     507.64     0.034      0.38       3.96    0.0003

TOTAL FOR CYCLE                 9.248                          6.913                          0.225                          0.0148

TOTAL FOR CYCLE/LB FUEL                                        0.748                          0.024                          0.0016
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DATE:   6/25/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL
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ENGINE DATA *****************************************************************************************************************
     CAL ID NUMBER:  209    ENGINE TYPE AND MODEL:  O-200-A                          SERIAL NUMBER:     213474

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840
***************************************************************************************************************************
OPERATIONAL DATA **********************************************************************************************************
      INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

      ATMOSPHERIC PRESSURE:              START   28.63   FINISH   -0.00

      INLET AIR HUMIDITY, GRN H2O/LB AIR:    87.00

      RELATIVE HUMIDITY:                     -0.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

      SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

 NUMBER OF TESTS:   9

 COMMENTS:


                              TEST              POWER              MEASURED      AIR FLOW     CALCULATED
                              MODE         SHAFT       PERCENT       FUEL          LB/HR          F/A
                                            HP          RATED        FLOW
                                                                     LB/HR

 COLD START + 130 SEC           1          0.0           0           3.50          27.00        0.12963
 TAXI-IDLE LOW                  2          2.60          2           3.70          40.50        0.09136
 TAXI-IDLE HIGH                 3          7.50          7           9.00          81.00        0.11111
 RUN-UP                         4         19.50         19          13.20         153.00        0.08627
 TAKE-OFF 100%                  6         91.00         90          52.50         562.50        0.09333
 CLIMB-LEAN                     9         91.50         91          51.00         562.50        0.09067
 APPROACH                      10         29.10         29          21.50         202.50        0.10617
 TAXI-IDLE                     11          7.50          7          10.30          67.50        0.15259
 HOT START                     13          0.0           0           3.50          27.00        0.12963

                                                                         NO          NO         NO      ALDEHYDES    SMOKE    PARTICULATES
 TEST   EXHAUST    EXHAUST       CO          CO          THC                        2          X
 MODE     GAS        GAS        (DRY)         2         (WET)      (DRY)        (DRY)      (DRY)
          TEMP     PRESSURE     PPMV        (DRY)       PPMV       PPMV          PPMV       PPMV
       DEGREES F     PSIA                 PERCENT V

   1     -0.00      -0.00      76000.00    -0.00   27500.00       40.00        -0.00      -0.00      -0.00       -0.00       -0.00
   2     -0.00      -0.00      57000.00    -0.00    7500.00       35.00        -0.00      -0.00      -0.00       -0.00       -0.00
   3     -0.00      -0.00      74000.00    -0.00    4200.00       55.00        -0.00      -0.00      -0.00       -0.00       -0.00
   4     -0.00      -0.00       9000.00    -0.00     900.00      325.00        -0.00      -0.00      -0.00       -0.00       -0.00
   6     -0.00      -0.00      92500.00    -0.00    1000.00      140.00        -0.00      -0.00      -0.00       -0.00       -0.00
   9     -0.00      -0.00      86000.00    -0.00    1800[illegible]  170.00    -0.00      -0.00      -0.00       -0.00       -0.00
  10     -0.00      -0.00      52000.00    -0.00    1[illegible]  55.00        -0.00      -0.00      -0.00       -0.00       -0.00
  11     -0.00      -0.00      74000.00    -0.00    [illegible]    5.00        -0.00      -0.00      -0.00       -0.00       -0.00
  13     -0.00      -0.00      53000.00    -0.00    4[illegible]  30.00        -C.00      -0.00      -0.00       -0.00       -0.00


 TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
         LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
        LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1    561.73    152.50    -0.00     -0.00      0.49     -0.00      1.97      0.53     -0.00     -0.00      0.00     -0.00
   2    583.63     53.48    -0.00     -0.00      0.59     -0.00      2.16      0.20     -0.00     -0.00      0.00     -0.00
   3    634.06     26.04    -0.00     -0.00      0.77     -0.00      5.71      0.23     -0.00     -0.00      0.01     -0.00
   4     96.89      6.68    -0.00     -0.00      5.75     -0.00      1.28      0.09     -0.00     -0.00      0.08     -0.00
   6    929.33 .    7.02    -0.00     -0.00      2.31     -0.00     48.79      0.37     -0.00     -0.00      0.12     -0.00
   9    886.49     12.91    -0.00     -0.00      2.88     -0.00     45.21      0.66     -0.00     -0.00      0.15     -0.00
  10    464.81      9.61    -0.00     -0.00      0.81     -0.00      9.99      0.21     -0.00     -0.00      0.02     -0.00
  11    464.24     19.69    -0.00     -0.00      0.57     -0.00      4.78      0.20     -0.00     -0.00      0.01     -0.00
  13    391.74    221.82    -0.00     -0.00      C.97     -0.00      1.37      0.78     -0.00     -0.00      0.00     -0.00

                                                                                NO                  NO
 TEST           CO               CO              THC             NO               2                   X
 MODE                             2
          LB/1K HP-HR       LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR        LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2          0.831            -0.000           0.076           0.001           -0.000             0.001
   3          0.761            -0.000           0.031           0.001           -0.000             0.001
   4          0.066            -0.000           0.005           0.004           -0.000             0.004
   6          0.536            -0.000           0.004           0.001           -0.000             0.001
   9          0.494            -0.000           0.007           0.002           -0.000             0.002
  10          0.343            -0.000           0.007           0.001           -0.000             0.001
  11          0.638            -0.000           0.027           0.001           -0.000             0.001
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                              LTO CYCLE EMISSIONS

                                                                                                       NO        NO         NO
 TEST    TIME IN   MEASURED    FUEL      CO        CO        CO         HC        HC        HC       LB/1K     LB/1K   EMISSION
 MODE     MODE    FUEL FLOW    USED     LB/1K     LB/1K   EMISSION    LB/1K     LB/1K   EMISSION   LB FUEL   HOURS      LBS.
          MIN.      LB/HR      LBS.    LB FUEL    HOURS     LBS.     LB FUEL    HOURS     LBS.

   3     12.00       9.00      1.80    634.06   5706.56    1.141      26.04    234.39    0.047      0.77       6.97   0.0014
   6      0.30      52.50      0.26    929.33  48789.93    0.244       7.02    368.76    0.002      2.31     121.29   0.0006
   9      5.00      51.00      4.23    886.49  45210.91    3.753      12.91    658.16    0.055      2.88     146.80   0.0122
  10      6.00      21.50      2.15    464.81   9993.48    0.999       9.61    206.62    0.021      0.81      17.36   0.0017
  11      4.00      10.30      0.69    464.24   4781.63    0.320      19.69    202.85    0.014      0.57       5.84   0.0004

 TOTAL FOR CYCLE                       9.136                       6.457                          0.138                       0.0163

 TOTAL FOR CYCLE/LB FUEL                                           0.707                          0.015                       0.0018
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DATE:  6/25/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  217    ENGINE TYPE AND MODEL:  O-470-R                    SERIAL NUMBER:     211305

                            RATED HORSEPOWER:   230.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   29.05   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    84.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:


                              TEST              POWER                MEASURED       AIR FLOW     CALCULATED
                              MODE        SHAFT        PERCENT         FUEL          LB/HR           F/A
                                           HP           RATED          FLOW
                                                                       LB/HR

COLD START + 130 SEC            1          0.0            0            15.50          94.50        0.16402
TAXI-IDLE LOW                   2          2.00           0            18.00         126.00        0.14286
TAXI-IDLE HIGH                  3          4.60           1            19.70         162.00        0.12160
RUN-UP                          4         23.90          10            32.00         297.00        0.10774
TAKE-OFF 100%                   6        191.10          83           133.00        1345.50        0.09885
CLIMB-RICH                      8        152.70          66            88.00        1044.00        0.08429
CLIMB-LEAN                      9        153.80          66            86.50        1066.50        0.08111
APPROACH                       10         39.00          16            34.00         373.50        0.09103
TAXI-IDLE                      11          4.30           1            17.90         139.50        0.12832
HOT START                      13          0.0            0            14.50          81.00        0.17901


 TEST   EXHAUST    EXHAUST       CO          CO       THC        NO        NO         NO      ALDEHYDES    SMOKE    PARTICULATES
 MODE    GAS        GAS        (DRY)        2        (WET)     (DRY)       2          X
         TEMP     PRESSURE     PPMV       (DRY)      PPMV      PPMV      (DRY)      (DRY)
       DEGREES F    PSIA               PERCENT V                         PPMV       PPMV

   1    -0.00      -0.00     64000.00    -0.00  50000.00    110.00     -0.00      -0.00      -0.00      -0.00        -0.00
   2    -0.00      -0.00     69000.00    -0.00  50000.00    125.00     -0.00      -0.00      -0.00      -0.00        -0.00
   3    -0.00      -0.00     97500.00    -0.00  47500.00    100.00     -0.00      -0.00      -0.00      -0.00        -0.00
   4    -0.00      -0.00     88000.00    -0.00   4500.00     90.00     -0.00      -0.00      -0.00      -0.00        -0.00
   6    -0.00      -0.00    120000.00    -0.00   3400.00     92.00     -0.00      -0.00      -0.00      -0.00        -0.00
   8    -0.00      -0.00     57000.00    -0.00   1200.00    350.00     -0.00      -0.00      -0.00      -0.00        -0.00
   9    -0.00      -0.00     53000.00    -0.00   1000.00    415.00     -0.00      -0.00      -0.00      -0.00        -0.00
  10    -0.00      -0.00     61500.00    -0.00   2500.00    120.00     -0.00      -0.00      -0.00      -0.00        -0.00
  11    -0.00      -0.00     83000.00    -0.00  50000.00    115.00     -0.00      -0.00      -0.00      -0.00        -0.00
  13    -0.00      -0.00     99000.00    -0.00  50000.00    160.00     -0.00      -0.00      -0.00      -0.00        -0.00


 TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
         LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
        LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1    372.66    233.52    -0.00     -0.00      1.05     -0.00       5.78      3.62     -0.00     -0.00      0.02     -0.00
   2    463.31    258.31    -0.00     -0.00      1.38     -0.00       8.34      4.65     -0.00     -0.00      0.02     -0.00
   3    767.35    275.93    -0.00     -0.00      1.29     -0.00      15.12      5.44     -0.00     -0.00      0.03     -0.00
   4    776.52     28.53    -0.00     -0.00      1.30     -0.00      24.85      0.91     -0.00     -0.00      0.04     -0.00
   6   1145.91     22.93    -0.00     -0.00      1.44     -0.00     152.41      3.05     -0.00     -0.00      0.19     -0.00
   8    626.54      9.06    -0.00     -0.00      6.32     -0.00      55.14      0.80     -0.00     -0.00      0.56     -0.00
   9    602.12      7.75    -0.00     -0.00      7.74     -0.00      52.08      0.67     -0.00     -0.00      0.67     -0.00
  10    632.14     17.87    -0.00     -0.00      2.03     -0.00      21.49      0.61     -0.00     -0.00      0.07     -0.00
  11    620.06    279.34    -0.00     -0.00      1.41     -0.00      11.10      5.00     -0.00     -0.00      0.03     -0.00
  13    525.01    219.09    -0.00     -0.00      1.39     -0.00       7.61      3.18     -0.00     -0.00      0.02     -0.00


 TEST          CO               CO               THC               NO               NO               NO
 MODE                            2                                                   2                X
           LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2         4.170           -0.000            2.325            0.012           -0.000            0.012
   3         3.786           -0.000            1.182            0.006           -0.000            0.006
   4         1.040           -0.000            0.038            0.002           -0.000            0.002
   6         0.798           -0.000            0.016            0.001           -0.000            0.001
   8         0.361           -0.000            0.005            0.004           -0.000            0.004
   9         0.339           -0.000            0.004            0.004           -0.000            0.004
  10         0.551           -0.000            0.016            0.002           -0.000            0.002
  11         2.581           -0.000            1.163            0.006           -0.000            0.006
*****HORSEPOWER-HP BASIS NOT CALCULABLE****


                                                LTO CYCLE EMISSIONS

 TEST   TIME IN   MEASURED     FUEL       CO         CO         CO        HC        HC        HC        NO        NO        NO
 MODE    MODE     FUEL FLOW    USED      LB/1K      LB/1K    EMISSION    LB/1K     LB/1K   EMISSION    LB/1K     LB/1K   EMISSION
         MIN.      LB/HR       LBS.     LB FUEL     HOURS      LBS.     LB FUEL    HOURS     LBS.     LB FUEL    HOURS     LBS.

   3    12.00      19.70       3.94     767.35   15116.75     3.023     275.93   5435.76    1.087      1.29      25.47    0.0051
   6     0.30     133.00       0.66    1145.91  152405.88     0.762      22.93   3049.29    0.015      1.44     191.92    0.0010
   9     5.00      86.50       7.18     602.12   52083.33     4.323       7.75    670.51    0.056      7.74     669.87    0.0556
  10     6.00      34.00       3.40     632.14   21492.89     2.149      17.87    607.69    0.061      2.03      68.88    0.0069
  11     4.00      17.90       1.20     620.06   11099.14     0.744     279.34   5000.11    0.335      1.41      25.26    0.0017

TOTAL FOR CYCLE                16.384                          11.001                        1.554                        0.0702

TOTAL FOR CYCLE/LB FUEL                                         0.671                        0.095                        0.0043
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DATE:   6/28/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:  218    ENGINE TYPE AND MODEL:  O-470-R                    SERIAL NUMBER:      211302A

                            RATED HORSEPOWER:   230.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    -0.00    FINISH    -0.00

     ATMOSPHERIC PRESSURE:              START    28.53    FINISH    -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:   109.00

     RELATIVE HUMIDITY:                        -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

 NUMBER OF TESTS:  10

 COMMENTS:


                              TEST            POWER                MEASURED     AIR FLOW     CALCULATED
                              MODE      SHAFT        PERCENT          FUEL        LB/HR          F/A
                                         HP           RATED           FLOW
                                                                      LB/HR

 COLD START + 130 SEC           1        0.0           0             15.40        99.00       0.15556
 TAXI-IDLE LOW                  2        1.50          0             16.70       117.00       0.14274
 TAXI-IDLE HIGH                 3        4.20          1             14.00       153.00       0.09150
 RUN-UP                         4       23.10         10             33.00       301.50       0.10945
 TAKE-OFF 100%                  6      158.7C         68            130.00      1323.00       0.09826
 CLIMB-RICH                     8      155.30         67             90.00      1012.50       0.08889
 CLIMB-LEAN                     9      156.80         68             86.50      1035.00       0.08357
 APPROACH                      10       52.60         22             42.00       495.00       0.08485
 TAXI-IDLE                     11        4.00          1             17.10       139.50       0.12258
 HOT START                     13        0.0           0             15.50       103.50       0.14976


  TEST   EXHAUST     EXHAUST       CO          CO        THC        NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS         GAS        (DRY)         2       (WET)     (DRY)        2         X
           TEMP      PRESSURE     PPMV        (DRY)      PPMV      PPMV      (DRY)     (DRY)
         DEGREES F     PSIA                 PERCENT V                        PPMV      PPMV

   1      -0.00       -0.00     76500.00    -0.00   50000.00    120.00    -0.00     -0.00      -0.00      -0.00       -0.00
   2      -0.00       -0.00     78000.00    -0.00   50000.00    110.00    -0.00     -0.00      -0.00      -0.00       -0.00
   3      -0.00       -0.00     97500.00    -0.00   48000.00     89.00    -0.00     -0.00      -0.00      -0.00       -0.00
   4      -0.00       -0.00    110000.00    -0.00    5000.00     50.00    -0.00     -0.00      -0.00      -0.00       -0.00
   6      -0.00       -0.00    122000.00    -0.00    3000.00     62.00    -0.00     -0.00      -0.00      -0.00       -0.00
   8      -0.00       -0.00     61500.00    -0.00    1500.00    265.00    -0.00     -0.00      -0.00      -0.00       -0.00
   9      -0.00       -0.00     54000.00    -0.00    1300.00    360.00    -0.00     -0.00      -0.00      -0.00       -0.00
  10      -0.00       -0.00     53000.00    -0.00    1600.00    260.00    -0.00     -0.00      -0.00      -0.00       -0.00
  11      -0.00       -0.00     74000.00    -0.00   50000.00     90.00    -0.00     -0.00      -0.00      -0.00       -0.00
  13      -0.00       -0.00     59000.00    -0.00   50000.00    122.00    -0.00     -0.00      -0.00      -0.00       -0.00


  TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K     LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1     468.01     242.74     -0.00      -0.00       1.21      -0.00       7.21       3.74      -0.00      -0.00       0.02      -0.00
   2     521.10     258.48     -0.00      -0.00       1.21      -0.00       8.70       4.32      -0.00      -0.00       0.02      -0.00
   3     991.86     341.91     -0.00      -0.00       1.49      -0.00      13.89       4.79      -0.00      -0.00       0.02      -0.00
   4     950.98      31.34     -0.00      -0.00       0.71      -0.00      31.38       1.03      -0.00      -0.00       0.02      -0.00
   6    1164.52      20.32     -0.00      -0.00       C.97      -0.00     151.39       2.64      -0.00      -0.00       0.13      -0.00
   8     641.80      10.91     -0.00      -0.00       4.54      -0.00      57.76       0.98      -0.00      -0.00       0.41      -0.00
   9     594.51       9.87     -0.00      -0.00       6.51      -0.00      51.43       0.85      -0.00      -0.00       0.56      -0.00
  10     575.94      12.02     -0.00      -0.00       4.64      -0.00      24.19       0.50      -0.00      -0.00       0.19      -0.00
  11     574.55     288.77     -0.00      -0.00       1.15      -0.00       9.82       4.94      -0.00      -0.00       0.02      -0.00
  13     375.37     249.57     -0.00      -0.00       1.27      -0.00       5.82       3.87      -0.00      -0.00       0.02      -0.00


  TEST          CO                CO               THC               NO                NO               NO
  MODE                             2                                                    2                X
            LB/1K HP-HR       LB/1K HP-HR      LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR      LB/1K HP-HR

 *****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2           5.802            -0.000            2.878            0.013            -0.000            0.013
   3           3.306            -0.000            1.140            0.005            -0.000            0.005
   4           1.359            -0.000            0.045            0.001            -0.000            0.001
   6           0.954            -0.000            0.017            0.001            -0.000            0.001
   8           0.372            -0.000            0.006            0.003            -0.000            0.003
   9           0.328            -0.000            0.005            0.004            -0.000            0.004
  10           0.460            -0.000            0.010            0.004            -0.000            0.004
  11           2.456            -0.000            1.234            0.005            -0.000            0.005
 *****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                 LTO CYCLE EMISSIONS

  TEST    TIME IN    MEASURED     FUEL       CO          CO          CO         HC         HC         HC         NO        NO         NO
  MODE     MODE     FUEL FLOW     USED      LB/1K       LB/1K     EMISSION     LB/1K      LB/1K    EMISSION     LB/1K     LB/1K    EMISSION
           MIN.       LB/HR       LBS.     LB FUEL      HOURS       LBS.      LB FUEL     HOURS       LBS.     LB FUEL    HOURS      LBS.

   3      12.00       14.00       2.80      991.86    13886.05     2.777     341.91    4786.76     0.957       1.49      20.82    0.0042
   6       0.30      130.00       0.65     1164.52   151388.06     0.757      20.32    2641.04     0.013       0.97     126.37    0.0006
   9       5.00       86.50       7.18      594.51    51425.15     4.268       9.87     853.65     0.071       6.51     563.12    0.0467
  10       6.00       42.00       4.20      575.94    24189.66     2.419      12.02     504.78     0.050       4.64     194.92    0.0195
  11       4.00       17.10       1.15      574.55     9824.86     0.658     288.77    4937.97     0.331       1.15      19.63    0.0013

                                                                                       1.423                         0.0723
 TOTAL FOR CYCLE                 15.975                           10.880

                                                                                       0.089                         0.0045
 TOTAL FOR CYCLE/LB FUEL                                           0.681
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DATE:   4/28/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  219    ENGINE TYPE AND MODEL:  O-470-R                     SERIAL NUMBER:     470-R-2113028

                            RATED HORSEPOWER:   230.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.58   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:   114.00

     RELATIVE HUMIDITY:                      -0.CC  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  11

COMMENTS:


                                 TEST              POWER                  MEASURED       AIR FLOW    CALCULATED
                                 MODE       SHAFT         PERCENT           FUEL          LB/HR         F/A
                                             HP            RATED            FLOW
                                                                           LB/HR

COLD START + 130 SEC               1          0.0            0              8.50          81.00       0.10494
TAXI-IDLE LOW                      2          1.60           0              8.80          81.00       0.10864
TAXI-IDLE HIGH                     3          4.00           1             12.70         126.00       0.10079
RUN-UP                             4         22.00           9             22.00         252.00       0.08730
TAKE-OFF 100%                      6        186.30          80            130.00        1305.00       0.09962
TAKE-OFF TO CLIMB                  7        152.90          66             91.00        1026.00       0.08869
CLIMB-RICH                         8        150.60          65             74.00         999.00       0.07407
CLIMB-LEAN                         9        154.00          66             86.50        1039.50       0.08321
APPROACH                          10         37.00          16             32.00         346.50       0.09235
TAXI-IDLE                         11          4.40           1             11.20         117.00       0.09573
HOT START                         13          0.0            0              8.50          72.00       0.11806


  TEST    EXHAUST      EXHAUST        CO          CC          THC         NO          NO          NO      ALDEHYDES     SMOKE      PARTICULATES
  MODE      GAS          GAS         (DRY)         2         (WET)       (DRY)         2           X
           TEMP       PRESSURE       PPMV        (DRY)        PPMV        PPMV       (DRY)       (DRY)
         DEGREES F      PSIA                   PERCENT V                             PPMV        PPMV

    1      -0.00        -0.00      52000.00     -0.00   20000.00       60.00       -C.00       -0.00       -0.00       -0.00          -0.00
    2      -0.00        -0.00      52000.00     -0.00   20000.00       45.00       -0.00       -0.00       -0.00       -0.00          -0.00
    3      -0.00        -0.00      59000.00     -0.0C   10000.00       40.00       -0.00       -0.00       -0.00       -0.00          -0.00
    4      -0.00        -0.00      59000.00     -0.00    2200.00       90.00       -0.00       -0.00       -0.00       -0.00          -0.00
    6      -0.00        -0.00     122000.00     -0.00    3100.00       6C.00       -0.00       -0.00       -0.00       -0.00          -0.00
    7      -0.00        -C.00      64000.00     -0.00    1500.00      220.00       -0.00       -0.00       -0.00       -0.00          -0.00
    8      -0.00        -0.00      73000.C0     -0.00    1000.00     1050.00       -C.00       -0.00       -0.00       -0.00          -0.00
    9      -0.00        -0.00      53000.00     -0.00    1300.00      335.00       -0.00       -0.00       -0.00       -0.00          -0.00
   10      -0.00        -0.00      71000.00     -0.00    1900.00       80.00       -C.00       -0.00       -0.00       -0.00          -C.00
   11      -0.00        -0.00      52000.00     -0.00    5500.00       48.00       -0.00       -0.00       -0.00       -0.00          -0.00
   13      -0.00        -0.00      52000.00     -0.00    2900.00       4C.00       -0.00       -0.00       -0.00       -0.00          -0.00


  TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE       CO         HC         NO2        CO2         NO        NOX         CO         HC        NO2        CO2         NO        NOX
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    1     466.92     129.22      -0.00      -0.00       0.88      -0.00       3.97       1.10      -0.00      -0.00       0.01      -0.00
    2     452.16     126.04      -0.00      -0.00       0.64      -0.00       3.98       1.11      -0.00      -0.00       0.01      -0.00
    3     549.69      66.50      -0.00      -0.00       0.61      -0.00       6.98       0.84      -0.00      -0.00       C.01      -0.00
    4     624.77      16.[illegible]      -0.C0      -0.00       1.57      -0.00      13.74       0.36      -0.00      -0.00       0.03      -C.00
    6    1148.84      20.79      -0.00      -0.00       0.93      -0.00     149.35       2.70      -0.00      -0.00       0.12      -0.00
    7     669.41      10.92      -0.00      -0.00       3.77      -0.00      60.93       0.99      -0.00      -C.00       0.34      -0.00
    8     888.91       8.25      -0.00      -0.0C      21.00      -0.00      65.77       0.61      -0.00      -0.00       1.55      -0.00
    9     585.01       9.90      -0.00      -0.00       6.07      -0.00      50.60       0.86      -0.00      -0.00       0.53      -0.00
   10     715.57      13.45      -0.00      -C.0C       1.32      -0.00      22.90       0.43      -0.00      -0.00       0.04      -0.00
   11     507.58      37.94      -0.C0      -0.00       0.77      -0.00       5.68       0.42      -0.00      -0.00       0.01      -0.00
   13     418.09      17.21      -0.00      -0.00       0.53      -0.00       3.55       0.15      -C.00      -0.00       0.00      -0.00


  TEST           CO                  CO               THC                NO                 NO                NO
  MODE                                2                                                      2                 X
            LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
    2          2.487             -0.000             0.693              0.004             -0.000             0.004
    3          1.745             -0.000             C.211              0.002             -0.000             0.002
    4          0.625             -0.000             0.016              0.002             -0.000             0.002
    6          0.802             -0.000             0.015              0.001             -0.000             0.0C1
    7          0.398             -0.000             0.007              0.002             -0.000             0.002
    8          0.437             -0.000             0.004              0.010             -0.000             0.010
    9          0.329             -0.000             0.006              0.003             -0.000             0.003
   10          0.619             -0.000             C.012              0.001             -0.000             0.001
   11          1.292             -0.000             0.097              0.002             -0.000             0.002
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                   LTC CYCLE EMISSIONS

  TEST    TIME IN   MEASURED     FUEL       CO         CO         CO        HC         HC         HC         NO        NO          NO
  MODE      MODE   FUEL FLOW     USED     LB/1K      LB/1K    EMISSION    LB/1K      LB/1K    EMISSION     LB/1K     LB/1K    EMISSION
            MIN.     LB/HR       LBS.    LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.      LB FUEL    HOURS       LBS.

    3      12.00     12.70       2.54     549.69    6981.07     1.396     66.50     844.56     0.169      0.61       7.77    0.0016
    6       0.30    130.00       0.65    1148.84  149349.50     0.747     20.79    2702.54     0.014      0.93     120.65    0.0006
    9       5.00     86.50       7.18     585.01   50603.19     4.200      9.90     856.24     0.071      6.07     525.37    0.0436
   10       6.00     32.00       3.20     715.57   22898.30     2.290     13.45     430.27     0.043      1.32      42.38    0.0042
   11       4.00     11.20       0.75     507.58    5684.90     0.381     37.94     424.98     0.028      0.77       8.62    0.0006

TOTAL FOR CYCLE                 14.320                          9.014                          0.325                          0.0506

TOTAL FOR CYCLE/LB FUEL                                         0.629                          0.023                          0.0035
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DATE:  6/21/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************
     CAL ID NUMBER:  210     ENGINE TYPE AND MODEL:  IO-520-P                  SERIAL NUMBER:      159850A

                             RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840
********************************************************************************************************
OPERATIONAL DATA ***************************************************************************************
       INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

       ATMOSPHERIC PRESSURE:              START   28.96   FINISH   -0.00

       INLET AIR HUMIDITY, GRN H2O/LB AIR:    63.00

       RELATIVE HUMIDITY:                     -0.00  PERCENT

       SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

       SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

  NUMBER OF TESTS:  10

  COMMENTS:


                                TEST            POWER                MEASURED     AIR FLOW     CALCULATED
                                MODE       SHAFT        PERCENT        FUEL        LB/HR          F/A
                                            HP           RATED         FLOW
                                                                       LB/HR

COLD START + 130 SEC             1          0.0            0          10.60        81.00       0.13086
TAXI-IDLE LOW                    2          1.90           0          11.00        85.50       0.12865
TAXI-IDLE HIGH                   3          4.60           1          16.00       130.50       0.12261
RUN-UP                           4         24.00           7          36.00       306.00       0.11765
TAKE-OFF 100%                    6        263.70          87         145.00      1566.00       0.09259
CLIMB-RICH                       8        202.10          67         110.00      1188.00       0.09259
CLIMB-LEAN                       9        202.90          67          92.00      1183.50       0.07774
APPROACH                        10         35.40          11          45.00       378.00       0.11905
TAXI-IDLE                       11          4.60           1          16.00       117.00       0.13675
HOT START                       13          0.0            0          10.50        81.00       0.12963


                                                                        NO          NO       ALDEHYDES    SMOKE    PARTICULATES
  TEST   EXHAUST    EXHAUST      CO         CO         THC       NO        2           X
  MODE     GAS        GAS       (DRY)        2        (WET)     (DRY)    (DRY)       (DRY)
           TEMP    PRESSURE     PPMV       (DRY)      PPMV      PPMV     PPMV        PPMV
        DEGREES F    PSIA               PERCENT V

   1     -0.00      -0.00    74000.00    -0.00      -0.00     47.00    -0.00      -0.00      -0.00      -0.00      -0.00
   2     -0.00      -0.00    69000.00    -0.00      -0.00     35.00    -0.00      -0.00      -0.00      -0.00      -0.00
   3     -0.00      -0.00    59000.00    -0.00      -0.00     25.00    -0.00      -0.00      -0.00      -0.00      -0.00
   4     -0.00      -0.00    54000.00    -0.00      -0.00     30.00    -0.00      -0.00      -0.00      -0.00      -0.00
   6     -0.00      -0.00    61500.00    -0.00      -0.00    460.00    -0.00      -0.00      -0.00      -0.00      -0.00
   8     -0.00      -0.00    61500.00    -0.00      -0.00    470.00    -0.00      -0.00      -0.00      -0.00      -0.00
   9     -0.00      -0.00    10000.00    -0.00      -0.00     -0.00    -0.00      -0.00      -0.00      -0.00      -0.00
  10     -0.00      -0.00    81000.00    -0.00      -0.00     -0.00    -0.00      -0.00      -0.00      -0.00      -0.00
  11     -0.00      -0.00    59000.00    -0.00      -0.00     30.00    -0.00      -0.00      -0.00      -0.00      -0.00
  13     -0.00      -0.00    81000.00    -0.00      -0.00     25.00    -0.00      -0.00      -0.00      -0.00      -0.00


                                                                           MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI       CO        HC        NO2       CO2       NO        NOX
  MODE     CO        HC        NO2       CO2       NO        NOX          LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1     544.96     -0.00     -0.00     -0.00      0.57     -0.00       5.78     -0.00     -0.00     -0.00      0.01     -0.00
   2     516.70     -0.00     -0.00     -0.00      0.43     -0.00       5.68     -0.00     -0.00     -0.00      0.00     -0.00
   3     462.98     -0.00     -0.00     -0.00      0.32     -0.00       7.41     -0.00     -0.00     -0.00      0.01     -0.00
   4     440.84     -0.00     -0.00     -0.00      0.40     -0.00      15.87     -0.00     -0.00     -0.00      0.01     -0.00
   6     625.75     -0.00     -0.00     -0.00      7.69     -0.00      90.73     -0.00     -0.00     -0.00      1.11     -0.00
   8     625.75     -0.00     -0.00     -0.00      7.85     -0.00      68.83     -0.00     -0.00     -0.00      0.86     -0.00
   9     118.33     -0.00     -0.00     -0.00     -0.00     -0.00      10.89     -0.00     -0.00     -0.00     -0.00     -0.00
  10     653.84     -0.00     -0.00     -0.00     -0.00     -0.00      29.42     -0.00     -0.00     -0.00     -0.00     -0.00
  11     415.98     -0.00     -0.00     -0.00      0.35     -0.00       6.66     -0.00     -0.00     -0.00      0.01     -0.00
  13     602.09     -0.00     -0.00     -0.00      0.31     -0.00       6.32     -0.00     -0.00     -0.00      0.00     -0.00


                                                                              NO
                                                                   NO          X
  TEST          CO               CO            THC          NO        2       LB/1K HP-HR
  MODE                            2                               LB/1K HP-HR
            LB/1K HP-HR      LB/1K HP-HR    LB/1K HP-HR   LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2          2.991           -0.000         -0.000        0.002      -0.000       0.002
   3          1.610           -0.000         -0.000        0.001      -0.000       0.001
   4          0.661           -0.000         -0.000        0.001      -0.000       0.001
   6          0.344           -0.000         -0.000        0.004      -0.000       0.004
   8          0.341           -0.000         -0.000        0.004      -0.000       0.004
   9          0.094           -0.000         -0.000       -0.000      -0.000      -0.000
  10          0.831           -0.000         -0.000       -0.000      -0.000      -0.000
  11          1.447           -0.000         -0.000        0.001      -0.000       0.001
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                   LTO CYCLE EMISSIONS
                                                                                                                    NO
                                                                         HC         HC         HC        NO        NO      EMISSION
  TEST    TIME IN   MEASURED    FUEL       CO        CO         CO     LB/1K      LB/1K    EMISSION    LB/1K     LB/1K      LBS.
  MODE     MODE     FUEL FLOW   USED     LB/1K     LB/1K    EMISSION  LB FUEL     HOURS      LBS.     LB FUEL    HOURS
           MIN.      LB/HR      LBS.    LB FUEL    HOURS      LBS.

   3      12.00      16.00      3.20    462.98    7407.62    1.482     -0.00      -0.00    -0.000      0.32       5.16    0.0010
   6       0.30     145.00      0.72    625.75   90733.19    0.454     -0.00      -0.00    -0.000      7.69    1114.73    0.0056
   9       5.00      92.00      7.64    118.33   10886.68    0.904     -0.00      -0.00    -0.000     -0.00      -0.00   -0.0000
  10       6.00      45.00      4.50    653.84   29422.80    2.942     -0.00      -0.00    -0.000     -0.00      -0.00   -0.0000
  11       4.00      16.00      1.07    415.98    6655.64    0.446     -0.00      -0.00    -0.000      0.35       5.56    0.0004

 TOTAL FOR CYCLE                   17.133                      6.227                         -0.000                        -0.0000

 TOTAL FOR CYCLE/LB FUEL                                       0.363                         -0.000                        -0.0000
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DATE:   6/21/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ************************************************************************************************************

     CAL ID NUMBER:  211    ENGINE TYPE AND MODEL:  IO-520-P                       SERIAL NUMBER:     1598508

                            RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 100/130          FUEL H/C RATIO:    1.840
************************************************************************************************************
OPERATIONAL DATA ************************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.96   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    63.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:


                                TEST           POWER                 MEASURED       AIR FLOW     CALCULATED
                                MODE     SHAFT        PERCENT          FUEL          LB/HR          F/A
                                          HP           RATED           FLOW
                                                                       LB/HR

COLD START + 130 SEC              1       0.0            0             10.80          81.00        0.13333
TAXI-IDLE LOW                     -       1.90           0             12.30          85.50        0.14386
TAXI-IDLE HIGH                    3       4.80           1             15.20         121.50        0.12510
RUN-UP                            4      24.20           8             37.00         310.50        0.11916
TAKE-OFF 100%                     6     264.20          88            145.00        1633.50        0.08877
CLIMB-RICH                        8     202.30          67            111.00        1197.00        0.09273
CLIMB-LEAN                        9     203.30          67             92.00        1192.50        0.07715
APPROACH                         10      35.80          11             48.00         369.00        0.13008
TAXI-IDLE                        11       4.50           1             14.50         112.50        0.12889
HOT START                        13       0.0            0             10.50          81.00        0.12963


                                                                      NO         NO         NO      ALDEHYDES    SMOKE    PARTICULATES
 TEST   EXHAUST    EXHAUST       CO          CO        THC           (DRY)       2          X
 MODE     GAS        GAS        (DRY)         2        (WET)         PPMV      (DRY)      (DRY)
         TEMP     PRESSURE      PPMV        (DRY)      PPMV                    PPMV       PPMV
       DEGREES F    PSIA                  PERCENT V

   1     -0.00      -0.00     74500.00     -0.00      -0.00        55.00     -0.00      -0.00      -0.00       -0.00       -0.00
   2     -0.00      -0.00     69000.00     -0.00      -0.00        35.00     -0.00      -0.00      -0.00       -0.00       -0.00
   3     -0.00      -0.00     62000.00     -0.00      -0.00        42.00     -0.00      -0.00      -0.00       -0.00       -0.00
   4     -0.00      -0.00     52000.00     -0.00      -0.00        47.00     -0.00      -0.00      -0.00       -0.00       -0.00
   6     -0.00      -0.00     54000.00     -0.00      -0.00       410.00     -0.00      -0.00      -0.00       -0.00       -0.00
   8     -0.00      -0.00     59000.00     -0.00      -0.00       410.00     -0.00      -0.00      -0.00       -0.00       -0.00
   9     -0.00      -0.00      8003.00     -0.00      -0.00        -0.00     -0.00      -0.00      -0.00       -0.00       -0.00
  10     -0.00      -0.00     62000.00     -0.00      -0.00        35.00     -0.00      -0.00      -0.00       -0.00       -0.00
  11     -0.00      -0.00     59000.00     -0.00      -0.00        42.00     -0.00      -0.00      -0.00       -0.00       -0.00
  13     -0.00      -0.00     78000.00     -0.00      -0.00        55.00     -0.00      -0.00      -0.00       -0.00       -0.00


                                                                                    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI     HC        NO2       CO2        NO       NOX
 MODE     CO         HC         NO2        CO2         NO        NOX         CO       LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR
        LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1    553.09      -0.00      -0.00      -0.00       0.65      -0.00       5.97     -0.00     -0.00     -0.00      0.01     -0.00
   2    462.35      -0.00      -0.00      -0.00       0.39      -0.00       5.69     -0.00     -0.00     -0.00      0.00     -0.00
   3    477.12      -0.00      -0.00      -0.00       0.53      -0.00       7.25     -0.00     -0.00     -0.00      0.01     -0.00
   4    419.36      -0.00      -0.00      -0.00       0.62      -0.00      15.52     -0.00     -0.00     -0.00      0.02     -0.00
   6    570.25      -0.00      -0.00      -0.00       7.11      -0.00      82.69     -0.00     -0.00     -0.00      1.03     -0.00
   8    599.51      -0.00      -0.00      -0.00       6.84      -0.00      66.55     -0.00     -0.00     -0.00      0.76     -0.00
   9     95.27      -0.00      -0.00      -0.00      -0.00      -0.00       8.76     -0.00     -0.00     -0.00     -0.00     -0.00
  10    459.29      -0.00      -0.00      -0.00       0.43      -0.00      22.05     -0.00     -0.00     -0.00      0.02     -0.00
  11    441.03      -0.00      -0.00      -0.00       0.52      -0.00       6.39     -0.00     -0.00     -0.00      0.01     -0.00
  13    579.79      -0.00      -0.00      -0.00       0.67      -0.00       6.04     -0.00     -0.00     -0.00      0.01     -0.00


                                                                  NO                 NO                NO
 TEST        CO               CO              THC                                    2                 X
 MODE                          2
          LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2        2.993           -0.000          -0.000              0.002            -0.000             0.002
   3        1.511           -0.000          -0.000              0.002            -0.000             0.002
   4        0.641           -0.009          -0.000              0.001            -0.000             0.001
   6        0.313           -0.009          -0.000              0.004            -0.000             0.004
   8        0.329           -0.000          -0.000              0.004            -0.000             0.004
   9        0.043           -0.000          -0.000             -0.000            -0.000            -0.000
  10        0.616           -0.000          -0.000              0.001            -0.000             0.001
  11        1.421           -0.000          -0.000              0.002            -0.000             0.002
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                  LTO CYCLE EMISSIONS

                                                                                                           NO        NO         NO
 TEST   TIME IN   MEASURED    FUEL      CO         CO          CO         HC        HC         HC        LB/1K     LB/1K    EMISSION
 MODE    MODE    FUEL FLOW    USED     LB/1K      LB/1K     EMISSION     LB/1K     LB/1K    EMISSION    LB FUEL    HOURS      LBS.
         MIN.      LB/HR      LBS.    LB FUEL     HOURS       LBS.      LB FUEL    HOURS      LBS.

   3    12.00      15.20      3.04    477.12     7252.21     1.450      -0.00     -0.00     -0.000      0.53       8.07     0.0016
   6     0.30     145.00      0.72    570.25    82686.63     0.413      -0.00     -0.00     -0.000      7.11    1031.21     0.0052
   9     5.00      92.00      7.64     95.27     8764.89     0.727      -0.00     -0.00     -0.000     -0.00      -0.00    -0.0000
  10     6.00      48.00      4.80    459.29    22045.99     2.205      -0.00     -0.00     -0.000      0.43      20.44     0.0020
  11     4.00      14.50      0.97    441.03     6394.95     0.428      -0.00     -0.00     -0.000      0.52       7.48     0.0005

TOTAL FOR CYCLE                      17.172                          5.224                          -0.000                          -0.0000

TOTAL FOR CYCLE/LB FUEL                                              0.304                          -0.000                          -0.0000
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DATE:  6/22/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  212     ENGINE TYPE AND MODEL:  IO-520-P                 SERIAL NUMBER:      159977A

                             RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:      -0. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.94   FINISH   -0.00

     INLET AIR HUMIDITY  GRN H2O/LB AIR:    63.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   9

COMMENTS:


                               TEST            POWER              MEASURED      AIR FLOW     CALCULATED
                               MODE      SHAFT       PERCENT        FUEL         LB/HR           F/A
                                          HP          RATED         FLOW
                                                                    LB/HR

COLD START + 130 SEC             1        0.0           0           11.50         81.00        0.14198
TAXI-IDLE HIGH                   3        4.60          1           18.10        144.00        0.12569
RUN-UP                           4       23.60          7           39.00        315.00        0.12381
TAKE-OFF 100%                    6      261.40         87          154.00       1597.50        0.09640
CLIMB-RICH                       8      200.00         66          123.00       1192.50        0.10314
CLIMB-LEAN                       9      204.80         68           92.00       1183.50        0.07774
APPROACH                        10       37.30         12           46.00        396.00        0.11616
TAXI-IDLE                       11        4.20          1           14.60        117.00        0.12479
HOT START                       13        0.0           0            8.10         67.50        0.12000


  TEST   EXHAUST    EXHAUST       CO         CO        THC        NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS        GAS        (DRY)        2        (WET)     (DRY)       2         X
          TEMP      PRESSURE     PPMV       (DRY)      PPMV      PPMV      (DRY)     (DRY)
        DEGREES F    PSIA               PERCENT V                          PPMV      PPMV

   1      -0.00      -0.00     87500.00    -0.00   47500.00    145.00     -0.00     -0.00     -0.00      -0.00        -0.00
   3      -0.00      -0.00     52000.00    -0.00   42500.00    177.00     -0.00     -0.00     -0.00      -0.00        -0.00
   4      -0.00      -0.00    116000.00    -0.00    9000.00    125.00     -0.00     -0.00     -0.00      -0.00        -0.00
   6      -0.00      -0.00     87500.00    -0.00    2400.00    205.00     -0.00     -0.00     -0.00      -0.00        -0.00
   8      -0.00      -0.00     97500.00    -0.00    2400.00    175.00     -0.00     -0.00     -0.00      -0.00        -0.00
   9      -0.00      -0.00      9000.00    -0.00    1300.00   2250.00     -0.00     -0.00     -0.00      -0.00        -0.00
  10      -0.00      -0.00    122000.00    -0.00   11000.00     55.00     -0.00     -0.00     -0.00      -0.00        -0.00
  11      -0.00      -0.00     54000.00    -0.00   37500.00     60.00     -0.00     -0.00     -0.00      -0.00        -0.00
  13      -0.00      -0.00     73500.00    -0.00   45000.00     60.00     -0.00     -0.00     -0.00      -0.00        -0.00


  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1     594.18    246.51     -0.00     -0.00      1.62     -0.00      6.83      2.83     -0.00     -0.00      0.02     -0.00
   3     398.34    241.02     -0.00     -0.00      2.23     -0.00      7.21      4.36     -0.00     -0.00      0.04     -0.00
   4     901.71     51.60     -0.00     -0.00      1.60     -0.00     35.17      2.01     -0.00     -0.00      0.06     -0.00
   6     858.84     16.48     -0.00     -0.00      3.31     -0.00    132.26      2.54     -0.00     -0.00      0.51     -0.00
   8     900.07     15.70     -0.00     -0.00      2.65     -0.00    110.71      1.93     -0.00     -0.00      0.33     -0.00
   9     106.50     10.38     -0.00     -0.00     43.73     -0.00      9.80      0.95     -0.00     -0.00      4.02     -0.00
  10    1008.09     66.05     -0.00     -0.00      0.75     -0.00     46.37      3.04     -0.00     -0.00      0.03     -0.00
  11     416.58    213.79     -0.00     -0.00      0.76     -0.00      6.08      3.12     -0.00     -0.00      0.01     -0.00
  13     588.79    263.93     -0.00     -0.00      0.79     -0.00      4.77      2.14     -0.00     -0.00      0.01     -0.00


  TEST          CO               CO               THC              NO               NO               NO
  MODE                            2                                                  2                X
            LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   3         1.567           -0.000           0.948            0.009            -0.000            0.009
   4         1.490           -0.000           0.085            0.003            -0.000            0.003
   6         0.506           -0.000           0.010            0.002            -0.000            0.002
   8         0.554           -0.000           0.010            0.002            -0.000            0.002
   9         0.048           -0.000           0.005            0.020            -0.000            0.020
  10         1.243           -0.000           0.081            0.001            -0.000            0.001
  11         1.448           -0.000           0.743            0.003            -0.000            0.003
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                              LTO CYCLE EMISSIONS

  TEST   TIME IN   MEASURED    FUEL      CO         CO         CO        HC        HC       HC        NO        NO        NO
  MODE    MODE    FUEL FLOW    USED     LB/1K      LB/1K    EMISSION    LB/1K     LB/1K   EMISSION    LB/1K     LB/1K   EMISSION
          MIN.      LB/HR      LBS.    LB FUEL     HOURS      LBS.     LB FUEL    HOURS     LBS.     LB FUEL    HOURS     LBS.

   3     12.00      18.10      3.62     398.34    7209.88     1.442    241.02   4362.54    0.873      2.23     40.31    0.0081
   6      0.30     154.00      0.77     858.84  132261.56     0.661     16.48   2537.19    0.013      3.31    508.98    0.0025
   9      5.00      92.00      7.64     106.50    9798.02     0.813     10.38    954.74    0.079     43.73   4023.45    0.3339
  10      6.00      46.00      4.60    1008.09   46372.05     4.637     66.05   3038.48    0.304      0.75     34.34    0.0034
  11      4.00      14.60      0.98     416.58    6082.04     0.407    213.79   3121.36    0.209      0.76     11.10    0.0007

TOTAL FOR CYCLE                17.604                         7.961                        1.477                        0.3487

TOTAL FOR CYCLE/LB FUEL                                       0.452                        0.084                        0.0198
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DATE:  6/22/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:  213      ENGINE TYPE AND MODEL:  IO-520-P                 SERIAL NUMBER:      1599778

                              RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:       -0. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA **********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00    FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.94    FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    63.00

     RELATIVE HUMIDITY:                         -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,   FLOW RATE, LITERS/MIN:    -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:    -0.00

NUMBER OF TESTS:  10

COMMENTS:


                                     TEST               POWER                MEASURED        AIR FLOW      CALCULATED
                                     MODE          SHAFT        PERCENT        FUEL           LB/HR           F/A
                                                    HP          RATED          FLOW
                                                                               LB/HR

COLD START + 130 SEC                   1            0.0            0             9.60          76.50         0.12549
TAXI-IDLE LOW                          2            2.60           0            10.50          81.00         0.12963
TAXI-IDLE HIGH                         3            6.10           2            17.20         135.00         0.12741
RUN-UP                                 4           26.60           8            37.00         315.00         0.11746
TAKE-OFF 100%                          6          262.80          87           152.00        1548.00         0.09819
CLIMB-RICH                             8          206.20          68           123.00        1206.00         0.10199
CLIMB-LEAN                             9          209.20          69            92.00        1188.00         0.07744
APPROACH                              10           40.00          13            46.00         391.50         0.11750
TAXI-IDLE                             11            5.70           1            14.20         117.00         0.12137
HOT START                             13            0.0            0            10.00          67.50         0.14815


 TEST    EXHAUST     EXHAUST       CO          CO          THC         NO         NO         NO     ALDEHYDES     SMOKE     PARTICULATES
 MODE      GAS         GAS        (DRY)         2         (WET)      (DRY)        2          X
          TEMP      PRESSURE      PPMV        (DRY)       PPMV       PPMV       (DRY)      (DRY)
        DEGREES F     PSIA                  PERCENT V                           PPMV       PPMV

   1      -0.00      -0.00      9500.00     -0.00   50000.00     295.00     -0.00      -0.00      -0.00       -0.00         -0.00
   2      -0.00      -0.00     84500.00     -0.00   50000.00     112.00     -0.00      -0.00      -0.00       -0.00         -0.00
   3      -0.00      -0.00     59000.00     -0.00   42500.00      85.00     -0.00      -0.00      -0.00       -0.00         -0.00
   4      -0.00      -0.00    117000.00     -0.00    9500.00      68.00     -0.00      -0.00      -0.00       -0.00         -0.00
   6      -0.00      -0.00     88000.00     -0.00    2500.00     215.00     -0.00      -0.00      -0.00       -0.00         -0.00
   8      -0.00      -0.00     92500.00     -0.00    2300.00     190.00     -0.00      -0.00      -0.00       -0.00         -0.00
   9      -0.00      -0.00      8330.00     -0.00    1200.00    2825.00     -0.00      -0.00      -0.00       -0.00         -0.00
  10      -0.00      -0.00    122000.00     -0.00    1100.00      87.00     -0.00      -0.00      -0.00       -0.00         -0.00
  11      -0.00      -0.00     52000.00     -0.00   50000.00     100.00     -0.00      -0.00      -0.00       -0.00         -0.00
  13      -0.00      -0.00     74000.00     -0.00   50000.00     110.00     -0.00      -0.00      -0.00       -0.00         -0.00


 TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1      72.89     283.89     -0.00      -0.00       3.72      -0.00       0.70       2.73      -0.00      -0.00       0.04      -0.00
   2     626.11     277.27     -0.00      -0.00       1.37      -0.00       6.60       2.91      -0.00      -0.00       0.01      -0.00
   3     446.04     238.66     -0.00      -0.00       1.06      -0.00       7.67       4.11      -0.00      -0.00       0.02      -0.00
   4     956.61      56.59     -0.00      -0.00       0.91      -0.00      35.39       2.09      -0.00      -0.00       0.03      -0.00
   6     849.56      16.94     -0.00      -0.00       3.41      -0.00     129.13       2.57      -0.00      -0.00       0.52      -0.00
   8     862.75      15.17     -0.00      -0.00       2.91      -0.00     106.12       1.87      -0.00      -0.00       0.36      -0.00
   9      96.53       9.60     -0.00      -0.00      55.08      -0.00       9.06       0.88      -0.00      -0.00       5.07      -0.00
  10     997.19       6.55     -0.00      -0.00       1.17      -0.00      45.87       0.30      -0.00      -0.00       0.05      -0.00
  11     412.05     290.86     -0.00      -0.00       1.30      -0.00       5.85       4.13      -0.00      -0.00       0.02      -0.00
  13     481.27     251.55     -0.00      -0.00       1.18      -0.00       4.81       2.52      -0.00      -0.00       0.01      -0.00


 TEST          CO                  CO                 THC                  NO                  NO                  NO
 MODE                               2                                                           2                   X
          LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
  2          2.537              -0.000              1.120               0.006              -0.000               0.006
  3          1.258              -0.000              0.673               0.003              -0.000               0.003
  4          1.331              -0.000              0.079               0.001              -0.000               0.001
  6          0.491              -0.000              0.010               0.002              -0.000               0.002
  8          0.515              -0.000              0.009               0.002              -0.000               0.002
  9          0.043              -0.000              0.004               0.024              -0.000               0.024
 10          1.147              -0.000              0.008               0.001              -0.000               0.001
 11          1.027              -0.000              0.725               0.003              -0.000               0.003
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                 LTO CYCLE EMISSIONS

 TEST    TIME IN   MEASURED     FUEL       CO         CO         CO         HC         HC         HC         NO         NO         NO
 MODE     MODE    FUEL FLOW     USED      LB/1K      LB/1K    EMISSION     LB/1K      LB/1K    EMISSION     LB/1K      LB/1K    EMISSION
          MIN.      LB/HR       LBS.     LB FUEL     HOURS      LBS.      LB FUEL     HOURS      LBS.      LB FUEL     HOURS      LBS.

   3     12.00      17.20       3.44     446.04    7671.91     1.534     238.66    4105.03     0.821      1.06       18.15    0.0036
   6      0.30     152.00       0.76     849.56  129132.56     0.646      16.94    2574.63     0.013      3.41      518.22    0.0026
   9      5.00      92.00       7.64      96.53    9064.78     0.752       9.60     883.61     0.073     55.08     5067.79    0.4206
  10      6.00      46.00       4.60     997.19   45870.94     4.587       6.55     301.35     0.030      1.17       53.73    0.0054
  11      4.00      14.20       0.95     412.05    5851.16     0.392     290.86    4130.23     0.277      1.30       18.48    0.0012

TOTAL FOR CYCLE                17.387                          7.912                            1.214                           0.4335

TOTAL FOR CYCLE/LB FUEL                                        0.455                            0.070                           0.0249
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DATE:   6/23/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  214    ENGINE TYPE AND MODEL:  IO-520-P                  SERIAL NUMBER:     159932A

                            RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.60   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    85.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:


                                   TEST            POWER             MEASURED      AIR FLOW     CALCULATED
                                   MODE      SHAFT       PERCENT       FUEL         LB/HR          F/A
                                               HP         RATED        FLOW
                                                                       LB/HR

COLD START + 130 SEC                1          0.0          0          10.00         81.00        0.12346
TAXI-IDLE LOW                       2          2.30         0          10.50         99.00        0.10606
TAXI-IDLE HIGH                      3          5.40         1          14.30        130.50        0.10958
RUN-UP                              4         25.40         8          31.00        288.00        0.10764
TAKE-OFF 100%                       6        259.80        86         144.00       1534.50        0.09384
CLIMB-RICH                          8        205.90        68         112.00       1206.00        0.09287
CLIMB-LEAN                          9        207.70        69          92.00       1188.00        0.07744
APPROACH                           10         32.30        10          34.50        306.00        0.11275
TAXI-IDLE                          11          5.00         1          13.00        112.50        0.11556
HOT START                          13          0.0          0           8.30         63.00        0.13175


   TEST    EXHAUST      EXHAUST       CO           CO         THC         NO          NO          NO       ALDEHYDES     SMOKE      PARTICULATES
   MODE      GAS          GAS        (DRY)          2        (WET)       (DRY)         2           X
            TEMP        PRESSURE     PPMV        (DRY)       PPMV        PPMV        (DRY)       (DRY)
          DEGREES F      PSIA                  PERCENT V                             PPMV        PPMV

    1      -0.00        -0.00     52000.00     -0.00   20000.00     100.00       -0.00       -0.00       -0.00        -0.00        -0.00
    2      -0.00        -0.00     90000.00     -0.00   10000.00     150.00       -0.00       -0.00       -0.00        -0.00        -0.00
    3      -0.00        -0.00     78000.00     -0.00    3500.00     110.00       -0.00       -0.00       -0.00        -0.00        -0.00
    4      -0.00        -0.00     54000.00     -0.00    2900.00     140.00       -0.00       -0.00       -0.00        -0.00        -0.00
    6      -0.00        -0.00     66500.00     -0.00    2000.00     310.00       -C.00       -0.00       -0.00        -0.00        -0.00
    8      -0.00        -0.00     57000.00     -0.00    2000.00     420.00       -0.00       -0.00       -0.00        -0.00        -0.00
    9      -0.00        -0.00      8000.00     -0.00    1600.00    2875.00       -0.00       -0.00       -0.00        -0.00        -0.00
   10      -0.00        -0.00     81000.00     -0.00    3600.00     115.00       -0.00       -0.00       -0.00        -0.00        -0.00
   11      -0.00        -0.00     53000.00     -0.00    7500.00      85.00       -0.00       -0.00       -0.00        -0.00        -0.00
   13      -0.00        -0.00     66500.00     -0.00   37500.00      90.00       -0.00       -0.00


   TEST     MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
   MODE        CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
             LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
            LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    1       403.23     114.91      -0.00      -0.00       1.27      -0.00       4.03       1.15      -0.00      -0.00       0.01      -0.00
    2       805.64      64.12      -0.00      -C.00       2.21      -0.00       8.46       0.67      -0.00      -0.00       0.02      -0.00
    3       677.39      21.92      -0.00      -0.00       1.57      -0.00       9.69       0.31      -0.00      -0.00       0.02      -0.00
    4       476.82      18.40      -0.00      -0.00       2.03      -0.00      14.78       0.57      -0.00      -0.00       0.06      -0.00
    6       665.20      13.99      -0.00      -0.00       5.09      -0.00      95.79       2.02      -0.00      -0.00       0.73      -0.00
    8       575.48      14.10      -0.00      -0.00       6.97      -0.00      64.45       1.58      -0.00      -0.00       0.78      -0.00
    9        94.49      12.81      -0.00      -0.00      55.78      -0.00       8.69       1.18      -0.00      -0.00       5.13      -0.00
   10       684.91      22.09      -0.00      -0.00       1.60      -0.00      23.63       0.76      -0.00      -0.00       0.06      -0.00
   11       437.85      45.21      -0.00      -0.00       1.15      -0.00       5.69       0.59      -0.00      -0.00       0.01      -0.00
   13       483.98     205.52      -0.00      -0.00       1.08      -0.00       4.02       1.71      -0.00      -0.00       0.01      -0.00


   TEST           CO                 CO               THC               NO                NO                NO
   MODE                               2                                                    2                 X
             LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
    2           3.678             -0.000             0.293             0.010            -0.000             0.010
    3           1.794             -0.000             0.058             0.004            -0.000             0.004
    4           0.582             -0.000             0.022             0.002            -0.000             0.002
    6           0.369             -0.000             0.008             0.003            -0.000             0.003
    8           0.313             -0.000             0.008             0.004            -0.000             0.004
    9           0.042             -0.000             0.006             0.025            -0.000             0.025
   10           0.732             -0.000             0.024             0.002            -0.000             0.002
   11           1.138             -0.000             0.118             0.003            -0.000             0.003
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                   LTO CYCLE EMISSIONS

   TEST    TIME IN   MEASURED     FUEL       CO         CO         CO         HC         HC         HC         NO         NO         NO
   MODE     MODE    FUEL FLOW     USED      LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION    LB/1K      LB/1K     EMISSION
            MIN.      LB/HR       LBS.     LB FUEL     HOURS      LBS.      LB FUEL     HOURS      LBS.      LB FUEL     HOURS      LBS.

    3      12.00      14.30       2.86     677.39    9686.64     1.937      21.92     313.47     0.063       1.57      22.44     0.0045
    6       0.30     144.00       0.72     665.20   95788.94     0.479      13.99    2015.16     0.010       5.09     733.46     0.0037
    9       5.00      92.00       7.64      94.49    8692.87     0.722      12.81    1178.14     0.098      55.78    5131.35     0.4259
   10       6.00      34.50       3.45     684.91   23629.47     2.363      22.09     762.07     0.076       1.60      55.10     0.0055
   11       4.00      13.00       0.87     437.85    5692.07     0.381      45.21     587.70     0.039       1.15      14.99     0.0010

TOTAL FOR CYCLE                  15.537                          5.882                          0.286                          0.4406

TOTAL FOR CYCLE/LB FUEL                                          0.379                          0.018                          0.0284
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DATE:  6/23/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:  215     ENGINE TYPE AND MODEL:  IO-520-P                    SERIAL NUMBER:     159982B

                             RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:      -0. HRS

     FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.60   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    85.00

     RELATIVE HUMIDITY:                    -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:


                                   TEST            POWER                  MEASURED      AIR FLOW     CALCULATED
                                   MODE       SHAFT       PERCENT           FUEL         LB/HR          F/A
                                                HP         RATED            FLOW
                                                                            LB/HR

COLD START + 130 SEC                1          0.0           0               8.10        63.00       0.12857
TAXI-IDLE LOW                       2          1.80          0              10.30        81.00       0.12716
TAXI-IDLE HIGH                      3          4.80          1              13.40       121.50       0.11029
RUN-UP                              4         23.50          7              30.50       279.00       0.10932
TAKF-OFF 100%                       6        263.00         87             146.00      1561.50       0.09350
CLIMB-RICH                          8        207.30         69             112.00      1224.00       0.09150
CLIMB-LEAN                          9        209.50         69              92.00      1210.50       0.07600
APPROACH                           10         38.00         12              37.00       360.00       0.10278
TAXI-IDLE                          11          5.00          1              12.80       117.00       0.10940
HOT START                          13          0.0           0               7.50        63.00       0.11905


 TEST    EXHAUST     EXHAUST       CO          CO          THC         NO         NO         NO      ALDEHYDES    SMOKE     PARTICULATES
 MODE      GAS         GAS        (DRY)         2         (WET)       (DRY)        2          X
          TEMP       PRESSURE     PPMV        (DRY)       PPMV        PPMV       (DRY)      (DRY)
       DEGREES F      PSIA                 PERCENT V                             PPMV       PPMV

   1     -0.00       -0.00      10000.00     -0.00   35000.00      165.00     -0.00      -0.00      -0.00       -0.00        -0.00
   2     -0.00       -0.00      54000.00     -0.00   22500.00      208.00     -0.00      -0.00      -0.00       -0.00        -0.00
   3     -0.00       -0.00      66500.00     -0.00    7500.00       70.00     -0.00      -0.00      -0.00       -0.00        -0.00
   4     -0.00       -0.00      66500.00     -0.00   33000.00       90.00     -0.00      -0.00      -0.00       -0.00        -0.00
   6     -0.00       -0.00      71500.00     -0.00    2300.00      295.00     -0.00      -0.00      -0.00       -0.00        -0.00
   8     -0.00       -0.00      57000.00     -0.00    2000.00      400.00     -0.00      -0.00      -0.00       -0.00        -0.00
   9     -0.00       -0.00      10000.00     -0.00    1500.00     2625.00     -0.00      -0.00      -0.00       -0.00        -0.00
  10     -0.00       -0.00      83000.00     -0.00    3800.00      115.00     -0.00      -0.00      -0.00       -0.00        -0.00
  11     -0.00       -0.00      52000.00     -0.00    7500.00       75.00     -0.00      -0.00      -0.00       -0.00        -0.00
  13     -0.00       -0.00      66500.00     -0.00   37500.00       80.00     -0.00      -0.00      -0.00       -0.00        -0.00


 TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1      74.54     195.25      -0.00      -0.00       2.02      -0.00       0.60       1.58      -0.00      -0.00       0.02      -0.00
   2     406.90     126.53      -0.00      -0.00       2.57      -0.00       4.19       1.30      -0.00      -0.00       0.03      -0.00
   3     574.05      46.76      -0.00      -0.00       0.99      -0.00       7.69       0.63      -0.00      -0.00       0.01      -0.00
   4     578.79     207.04      -0.00      -0.00       1.29      -0.00      17.65       6.31      -0.00      -0.00       0.04      -0.00
   6     717.54      16.13      -0.00      -0.00       4.86      -0.00     104.76       2.36      -0.00      -0.00       0.71      -0.00
   8     583.08      14.25      -0.00      -0.00       6.72      -0.00      65.31       1.60      -0.00      -0.00       0.75      -0.00
   9     119.98      12.16      -0.00      -0.00      51.73      -0.00      11.04       1.12      -0.00      -0.00       4.76      -0.00
  10     764.78      24.92      -0.00      -0.00       1.74      -0.00      28.30       0.92      -0.00      -0.00       0.06      -0.00
  11     452.27      47.03      -0.00      -0.00       1.07      -0.00       5.79       0.60      -0.00      -0.00       0.01      -0.00
  13     534.03     221.22      -0.00      -0.00       1.06      -0.00       4.01       1.66      -0.00      -0.00       0.01      -0.00


 TEST          CO                  CO                 THC                 NO                  NO                  NO
 MODE                               2                                                          2                   X
          LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2          2.328              -0.000             0.724               0.015              -0.000               0.015
   3          1.603              -0.000             0.131               0.003              -0.000               0.003
   4          0.751              -0.000             0.269               0.002              -0.000               0.002
   6          0.398              -0.000             0.009               0.003              -0.000               0.003
   8          0.315              -0.000             0.008               0.004              -0.000               0.004
   9          0.053              -0.000             0.005               0.023              -0.000               0.023
  10          0.745              -0.000             0.024               0.002              -0.000               0.002
  11          1.158              -0.000             0.120               0.003              -0.000               0.003
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                 LTO CYCLE EMISSIONS

 TEST     TIME IN    MEASURED     FUEL       CO          CO         CO          HC         HC          HC         NO         NO         NO
 MODE      MODE     FUEL FLOW     USED      LB/1K       LB/1K     EMISSION     LB/1K      LB/1K     EMISSION     LB/1K      LB/1K     EMISSION
           MIN.       LB/HR       LBS.     LB FUEL      HOURS       LBS.      LB FUEL     HOURS       LBS.      LB FUEL     HOURS       LBS.

   3      12.00       13.40       2.68     574.05     7692.21     1.534       46.76      626.52     0.125       0.99        13.30     0.0027
   6       0.30      146.00       0.73     717.54   104761.31     0.524       16.13     2355.70     0.012       4.86       709.97     0.0035
   9       5.00       92.00       7.64     119.98    11038.04     0.916       12.16     1118.87     0.093      51.73      4759.28     0.3950
  10       6.00       37.00       3.70     764.78    28296.92     2.830       24.92      922.05     0.092       1.74        64.40     0.0064
  11       4.00       12.80       0.86     452.27     5789.10     0.388       47.03      601.96     0.040       1.07        13.71     0.0009

TOTAL FOR CYCLE                  15.604                           6.196                              0.362                             0.4086

TOTAL FOR CYCLE/LB FUEL                                           0.397                              0.023                             0.0262
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DATE:   6/24/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:  216    ENGINE TYPE AND MODEL:  IO-520-P                SERIAL NUMBER:     159983

                            RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840

OPERATIONAL DATA **********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.76   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    83.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:


                              TEST              POWER                MEASURED      AIR FLOW    CALCULATED
                              MODE       SHAFT        PERCENT          FUEL         LB/HR         F/A
                                          HP           RATED           FLOW
                                                                       LB/HR

COLD START + 130 SEC            1         0.0            0             10.50          90.00       0.11667
TAXI-IDLE LOW                   2         1.70           0             11.30         108.00       0.10463
TAXI-IDLE HIGH                  3         4.80           1             16.00         148.50       0.10774
RUN-UP                          4        23.70           7             34.50         306.00       0.11275
TAKE-OFF 100%                   6       255.70          85            150.00        1534.50       0.09775
CLIMB-RICH                      8       201.60          67            117.00        1174.50       0.09962
CLIMB-LEAN                      9       204.80          68             92.00        1161.00       0.07924
APPROACH                       10        35.80          11             43.00         387.00       0.11111
TAXI-IDLE                      11         4.00           1             13.30         126.00       0.10556
HOT START                      13         0.0            0              8.70          63.00       0.13810


 TEST   EXHAUST     EXHAUST       CO          CO         THC         NO         NO         NO      ALDEHYDES    SMOKE    PARTICULATES
 MODE     GAS         GAS        (DRY)         2        (WET)       (DRY)        2          X
          TEMP      PRESSURE     PPMV        (DRY)       PPMV        PPMV      (DRY)      (DRY)
        DEGREES F     PSIA                 PERCENT V                           PPMV       PPMV

   1     -0.00       -0.00     54000.00     -0.00   42500.00      90.00     -0.00      -0.00      -0.00       -0.00        -0.00
   2     -0.00       -0.00     67000.00     -0.00   36500.00      90.00     -0.00      -0.00      -0.00       -0.00        -0.00
   3     -0.00       -0.00     81000.00     -0.00   23000.00     105.00     -0.00      -0.00      -0.00       -0.00        -0.00
   4     -0.00       -0.00     76000.00     -0.00    7500.00     125.00     -0.00      -0.00      -0.00       -0.00        -0.00
   6     -0.00       -0.00     99000.00     -0.00    2600.00     160.00     -0.00      -0.00      -0.00       -0.00        -0.00
   8     -0.00       -0.00     76000.00     -0.00    2400.00     250.00     -0.00      -0.00      -0.00       -0.00        -0.00
   9     -0.00       -0.00     61500.00     -0.00    1600.00    2100.00     -0.00      -0.00      -0.00       -0.00        -0.00
  10     -0.00       -0.00    116000.00     -0.00    9500.00      80.00     -0.00      -0.00      -0.00       -0.00        -0.00
  11     -0.00       -0.00     88000.00     -0.00   42500.00     108.00     -0.00      -0.00      -0.00       -0.00        -0.00
  13     -0.00       -0.00      9000.00     -0.00   50000.00     116.00     -0.00      -0.00      -0.00       -0.00        -0.00


 TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1     442.29    254.41     -0.00     -0.00      1.21     -0.00      4.64      2.67     -0.00     -0.00      0.01     -0.00
   2     607.60    236.32     -0.00     -0.00      1.34     -0.00      6.87      2.67     -0.00     -0.00      0.02     -0.00
   3     714.92    145.81     -0.00     -0.00      1.52     -0.00     11.44      2.33     -0.00     -0.00      0.02     -0.00
   4     642.93     46.02     -0.00     -0.00      1.74     -0.00     22.18      1.59     -0.00     -0.00      0.06     -0.00
   6     955.17     17.67     -0.00     -0.00      2.54     -0.00    143.28      2.65     -0.00     -0.00      0.38     -0.00
   8     720.93     16.09     -0.00     -0.00      3.89     -0.00     84.34      1.88     -0.00     -0.00      0.46     -0.00
   9     712.77     12.60     -0.00     -0.00     39.98     -0.00     65.58      1.16     -0.00     -0.00      3.68     -0.00
  10     994.87     58.91     -0.00     -0.00      1.13     -0.00     42.78      2.53     -0.00     -0.00      0.05     -0.00
  11     791.59    273.44     -0.00     -0.00      1.60     -0.00     10.53      3.64     -0.00     -0.00      0.02     -0.00
  13      62.54    264.78     -0.00     -0.00      1.32     -0.00      0.54      2.30     -0.00     -0.00      0.01     -0.00


 TEST         CO                  CO                 THC                 NO                  NO                 NO
 MODE                              2                                                          2                  X
          LB/1K HP-HR         LB/1K HP-HR        LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR        LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2          4.039             -0.000              1.571               0.009              -0.000              0.009
   3          2.383             -0.000              0.486               0.005              -0.000              0.005
   4          0.936             -0.000              0.067               0.003              -0.000              0.003
   6          0.560             -0.000              0.010               0.001              -0.000              0.001
   8          0.418             -0.000              0.009               0.002              -0.000              0.002
   9          0.320             -0.000              0.006               0.018              -0.000              0.018
  10          1.195             -0.000              0.071               0.001              -0.000              0.001
  11          2.632             -0.000              0.909               0.005              -0.000              0.005
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                    LTO CYCLE EMISSIONS

 TEST    TIME IN   MEASURED     FUEL       CO         CO         CO         HC         HC        HC         NO         NO         NO
 MODE     MODE    FUEL FLOW     USED     LB/1K      LB/1K     EMISSION    LB/1K      LB/1K    EMISSION    LB/1K      LB/1K    EMISSION
          MIN.      LB/HR       LBS.    LB FUEL     HOURS       LBS.     LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.

   3     12.00      16.00       3.20    714.92   11438.64     2.288     145.81    2333.00     0.467      1.52      24.36     0.0049
   6      0.30     150.00       0.75    955.17  143275.38     0.716      17.67    2650.84     0.013      2.54     380.34     0.0019
   9      5.00      92.00       7.64    712.77   65575.13     5.443      12.60    1159.58     0.096     39.98    3677.93     0.3053
  10      6.00      43.00       4.30    994.87   42779.22     4.278      58.91    2533.01     0.253      1.13      48.46     0.0048
  11      4.00      13.30       0.89    791.59   10528.16     0.705     273.44    3636.72     0.244      1.60      21.22     0.0014

TOTAL FOR CYCLE                16.777                         13.430                          1.073                         0.3183

TOTAL FOR CYCLE/LB FUEL                                        0.801                          0.064                         0.0190
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O-200-A SUMMARY – CLIMB LEAN MODE

MODEL SUMMARY SAMPLE NUMBER = 5.

TEST MODE		MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
3	MEAN:	9.00	1.80	715.79	6478.47	1.296	39.02	356.26	0.0713	0.76	6.63	0.0013
	STD DEV:	1.06	0.21	99.19	1336.37	0.267	15.18	149.08	0.0298	0.25	1.42	0.0003
6	MEAN:	52.16	0.26	888.49	46350.61	0.232	13.87	723.60	0.0036	2.94	153.24	0.0008
	STD DEV:	0.42	0.00	34.94	2063.94	0.010	5.68	297.64	0.0015	0.59	30.16	0.0002
9	MEAN:	51.00	4.23	884.69	45119.34	3.745	14.10	719.33	0.0597	3.27	166.74	0.0138
	STD DEV:	0.0	0.01	9.10	459.29	0.038	1.49	75.90	0.0063	0.71	36.14	0.0030
10	MEAN:	21.90	2.19	472.35	10342.34	1.034	10.33	227.46	0.0227	0.80	17.57	0.0018
	STD DEV:	0.55	0.05	9.06	246.97	0.025	3.08	72.48	0.0072	0.16	3.48	0.0003
11	MEAN:	9.78	0.66	603.70	5919.19	0.397	22.31	215.52	0.0144	0.54	4.87	0.0003
	STD DEV:	2.06	0.14	89.29	1593.71	0.107	16.23	176.52	0.0118	0.28	1.18	0.0001
TOTAL FOR CYCLE	MEAN:		9.139			6.703			0.172			0.0180
	STD DEV:		0.354			0.339			0.043			0.0032
TOTAL FOR CYCLE/LB FUEL					MEAN:	0.733			0.019			0.0020
					STD DEV:	0.019			0.004			0.0004

O-470-R SUMMARY – CLIMB LEAN MODE

MODEL SUMMARY SAMPLE NUMBER = 3.

TEST MODE		MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
3	MEAN:	15.47	3.09	769.63	11994.62	2.399	228.11	3589.03	0.7378	1.13	18.02	0.0036
	STD DEV:	3.72	0.74	221.09	4385.25	0.877	143.80	2484.66	0.4969	0.46	9.17	0.0018
6	MEAN:	131.00	0.65	1153.09	151047.81	0.755	21.34	2797.62	0.0140	1.11	146.31	0.0007
	STD DEV:	1.74	0.01	9.97	1555.87	0.008	1.39	220.13	0.0011	0.29	39.60	0.0002
9	MEAN:	86.50	7.18	593.88	51370.54	4.264	9.17	793.47	0.0659	6.79	586.12	0.0486
	STD DEV:	0.04	0.01	8.57	742.23	0.062	1.23	106.49	0.0086	0.87	74.95	0.0062
10	MEAN:	36.00	3.60	641.22	22860.27	2.286	14.45	514.24	0.0514	2.66	102.06	0.0102
	STD DEV:	5.29	0.53	70.25	1349.13	0.135	3.05	89.09	0.0089	1.75	81.50	0.0082
11	MEAN:	15.40	1.03	567.40	8869.63	0.594	202.02	3454.35	0.2314	1.11	17.84	0.0012
	STD DEV:	3.66	0.25	56.58	2830.70	0.190	142.17	2623.70	0.1758	0.32	8.46	0.0006
TOTAL FOR CYCLE	MEAN:		15.560			10.298			1.101			0.0644
	STD DEV:		1.093			1.114			0.675			0.0120
TOTAL FOR CYCLE/LB FUEL					MEAN:	0.661			0.069			0.0041
					STD DEV:	0.027			0.040			0.0005

IO-520-P SUMMARY – CLIMB LEAN MODE

MODEL SUMMARY SAMPLE NUMBER = 5.

TEST MODE		MEASURED FUEL FLOW LB/HR	FUEL USED LBS.	CO LB/1K LB FUEL	CO LB/1K HOURS	CO EMISSION LBS.	HC LB/1K LB FUEL	HC LB/1K HOURS	HC EMISSION LBS.	NO LB/1K LB FUEL	NO LB/1K HOURS	NO EMISSION LBS.
3	MEAN:	15.80	3.16	552.15	8739.86	1.749	138.84	2348.11	0.4696	1.47	23.71	0.0047
	STD DEV:	1.96	0.39	138.81	1785.97	0.357	103.20	1387.36	0.3775	0.53	10.21	0.0020
6	MEAN:	149.20	0.75	809.26	121043.94	0.605	16.24	2426.70	0.0121	3.94	570.19	0.0029
	STD DEV:	4.15	0.02	116.76	19927.34	0.103	1.39	254.34	0.0013	1.09	148.90	0.0007
9	MEAN:	92.00	7.64	226.45	20833.76	1.729	11.51	1058.99	0.0879	49.26	4531.96	0.3762
	STD DEV:	0.13	0.01	272.03	25027.20	2.077	1.43	131.85	0.0109	7.06	649.23	0.0539
10	MEAN:	41.30	4.13	889.97	17389.69	3.739	35.70	1511.39	0.1511	1.28	51.21	0.0051
	STD DEV:	5.29	0.53	153.44	10650.04	1.065	25.55	1198.83	0.1199	[illegible]	11.04	0.0011
11	MEAN:	13.59	0.91	502.07	6788.50	0.455	174.07	2415.59	0.1618	1.19	15.50	0.0011
	STD DEV:	0.78	0.05	162.66	2095.45	0.140	120.25	1699.98	0.1139	0.31	3.99	0.0003
TOTAL FOR CYCLE	MEAN:		16.592			8.276			0.883			0.3899
	STD DEV:		0.972			3.035			0.531			0.0539
TOTAL FOR CYCLE/LB FUEL					MEAN:	0.497			0.052			0.0237
					STD DEV:	0.173			0.029			0.0041

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DATE:  6/18/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:  202    ENGINE TYPE AND MODEL:  O-200-A                  SERIAL NUMBER:     2134578

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA *******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.92   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    79.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:


                              TEST              POWER                  MEASURED       AIR FLOW    CALCULATED
                              MODE        SHAFT        PERCENT           FUEL          LB/HR          F/A
                                           HP           RATED            FLOW
                                                                         LB/HR

COLD START + 130 SFC           1          0.0            0               4.00          27.00        0.14815
TAXI-IDLE LOW                  2          2.10           2               5.30          45.00        0.11778
TAXI-IDLE HIGH                 3          7.00           6               6.30          72.00        0.08750
RUN-UP                         4         20.10          20              15.00         162.00        0.09259
TAKE-OFF 100%                  6         89.60          89              52.00         558.00        0.09319
CLIMB-RICH                     8         88.30          88              50.00         558.00        0.08961
CLIMB-LEAN                     9         87.50          87              50.00         558.00        0.08961
APPROACH                      10         28.00          27              23.00         207.00        0.11111
TAXI-IDLE                     11          9.30           9              10.00          63.00        0.15873
HOT START                     13          0.0            0               4.00          18.00        0.22222


  TEST    EXHAUST     EXHAUST       CO          CO         THC        NO         NO         NO      ALDEHYDES    SMOKE     PARTICULATES
  MODE      GAS         GAS        (DRY)         2        (WET)      (DRY)        2          X
           TEMP      PRESSURE      PPMV       (DRY)       PPMV       PPMV      (DRY)      (DRY)
        DEGREES F      PSIA                 PERCENT V                           PPMV       PPMV

   1      -0.00       -0.00     54000.00     -0.00       -0.00      25.00      -0.00      -0.00      -0.00       -0.00        -0.00
   2      -0.00       -0.00     54000.00     -0.00       -0.00      10.00      -0.00      -0.00      -0.00       -0.00        -0.00
   3      -0.00       -0.00     64000.00     -0.00       -0.00      10.00      -0.00      -0.00      -0.00       -0.00        -0.00
   4      -0.00       -0.00     78000.00     -0.00       -0.00      20.00      -0.00      -0.00      -0.00       -0.00        -0.00
   6      -0.00       -0.00     95000.00     -0.00       -0.00      60.00      -0.00      -0.00      -0.00       -0.00        -0.00
   8      -0.00       -0.00     95000.00     -0.00       -0.00      55.00      -0.00      -0.00      -0.00       -0.00        -0.00
   9      -0.00       -0.00     95000.00     -0.00       -0.00      55.00      -0.00      -0.00      -0.00       -0.00        -0.00
  10      -0.00       -0.00     53000.00     -0.00       -0.00      25.00      -0.00      -0.00      -0.00       -0.00        -0.00
  11      -0.00       -0.00     69000.00     -0.00       -0.00      25.00      -0.00      -0.00      -0.00       -0.00        -0.00
  13      -0.00       -0.00     54000.00     -0.00       -0.00      40.00      -0.00      -0.00      -0.00       -0.00        -0.00


  TEST    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1      349.86      -0.00      -0.00      -0.00       0.27      -0.00       1.40      -0.00      -0.00      -0.00       0.00      -0.00
   2      438.72      -0.00      -0.00      -0.00       0.13      -0.00       2.33      -0.00      -0.00      -0.00       0.00      -0.00
   3      681.86      -0.00      -0.00      -0.00       0.17      -0.00       4.30      -0.00      -0.00      -0.00       0.00      -0.00
   4      790.68      -0.00      -0.00      -0.00       0.33      -0.00      11.86      -0.00      -0.00      -0.00       0.00      -0.00
   6      957.53      -0.00      -0.00      -0.00       0.99      -0.00      49.79      -0.00      -0.00      -0.00       0.00      -0.00
   8      991.29      -0.00      -0.00      -0.00       0.94      -0.00      49.56      -0.00      -0.00      -0.00       0.05      -0.00
   9      991.29      -0.00      -0.00      -0.00       0.94      -0.00      49.56      -0.00      -0.00      -0.00       0.05      -0.00
  10      454.98      -0.00      -0.00      -0.00       0.35      -0.00      10.46      -0.00      -0.00      -0.00       0.01      -0.00
  11      416.32      -0.00      -0.00      -0.00       0.25      -0.00       4.16      -0.00      -0.00      -0.00       0.00      -0.00
  13      224.83      -0.00      -0.00      -0.00       0.27      -0.00       0.90      -0.00      -0.00      -0.00       0.00      -0.00


  TEST          CO                 CO                THC                NO                 NO                 NO
  MODE                              2                                                       2                  X
           LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2         1.107             -0.000             -0.000              0.000             -0.000              0.000
   3         0.614             -0.000             -0.000              0.000             -0.000              0.000
   4         0.590             -0.000             -0.000              0.000             -0.000              0.000
   6         0.556             -0.000             -0.000              0.001             -0.000              0.001
   8         0.561             -0.000             -0.000              0.001             -0.000              0.001
   9         0.566             -0.000             -0.000              0.001             -0.000              0.001
  10         0.374             -0.000             -0.000              0.000             -0.000              0.000
  11         0.448             -0.000             -0.000              0.000             -0.000              0.000
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                               LTO CYCLE EMISSIONS

  TEST    TIME IN    MEASURED     FUEL       CO         CO          CO        HC         HC        HC         NO         NO        NO
  MODE     MODE     FUEL FLOW     USED      LB/1K      LB/1K     EMISSION    LB/1K      LB/1K    EMISSION    LB/1K      LB/1K    EMISSION
           MIN.       LB/HR       LBS.     LB FUEL     HOURS       LBS.     LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.

   3      12.00       6.30       1.26      681.86    4295.69     0.859      -0.00      -0.00     -0.000      0.17       1.10    0.0002
   6       0.30      52.00       0.26      957.53   49791.52     0.249      -0.00      -0.00     -0.000      0.99      51.65    0.0003
   8       5.00      50.00       4.15      991.29   49564.45     4.114      -0.00      -0.00     -0.000      0.94      47.13    0.0039
  10       6.00      23.00       2.30      454.98   10464.45     1.046      -0.00      -0.00     -0.000      0.35       8.11    0.0008
  11       4.00      10.00       0.67      416.32    4163.23     0.279      -0.00      -0.00     -0.000      0.25       2.48    0.0002

TOTAL FOR CYCLE                  8.640                           6.547                         -0.000                         0.0054

TOTAL FOR CYCLE/LB FUEL                                          0.758                         -0.000                         0.0006
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DATE:   6/21/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  204    ENGINE TYPE AND MODEL:  O-200-A                     SERIAL NUMBER:     2135048

                            RATED HORSEPOWER:   100.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA *************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.91   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    65.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:



                                 TEST              POWER               MEASURED        AIR FLOW     CALCULATED
                                 MODE        SHAFT        PERCENT        FUEL           LB/HR           F/A
                                              HP           RATED         FLOW
                                                                         LB/HR

COLD START + 130 SEC               1          0.0            0            3.50          27.00         0.12963
TAXI-IDLE LOW                      2          2.00           1            4.30          36.00         0.11944
TAXI-IDLE HIGH                     3          6.80           6            7.60          67.50         0.11259
RUN-UP                             4         19.60          19           13.20         153.00         0.08627
TAKE-OFF 100%                      6         91.10          91           53.00         571.50         0.09274
CLIMB-RICH                         8         91.10          91           53.00         571.50         0.09274
CLIMB-LEAN                         9         90.30          90           51.00         567.00         0.08995
APPROACH                          10         28.80          28           22.00         202.50         0.10864
TAXI-IDLE                         11          7.00           6            6.50          67.50         0.09630
HOT START                         13          0.0            0            3.50          22.50         0.15556


  TEST    EXHAUST     EXHAUST        CO          CO          THC         NO          NO          NO       ALDEHYDES     SMOKE     PARTICULATES
  MODE      GAS         GAS         (DRY)          2         (WET)      (DRY)          2           x
           TEMP      PRESSURE       PPMV        (DRY)        PPMV       PPMV        (DRY)       (DRY)
        DEGREES F      PSIA                   PERCENT V                             PPMV        PPMV

   1      -0.00       -0.00       62500.00     -0.00       -0.00       25.00       -0.00       -0.00       -0.00       -0.00        -0.00
   2      -0.00       -0.00       74000.00     -0.00       -0.00       10.00       -0.00       -0.00       -0.00       -0.00        -0.00
   3      -0.00       -0.00       53500.00     -0.00       -0.00       25.00       -0.00       -0.00       -0.00       -0.00        -0.00
   4      -0.00       -0.00        6000.00     -0.00       -0.00      130.00       -0.00       -0.00       -0.00       -0.00        -0.00
   6      -0.00       -0.00       64000.00     -0.00       -0.00       96.00       -0.00       -0.00       -0.00       -0.00        -0.00
   8      -0.00       -0.00       64000.00     -0.00       -0.00       96.00       -0.00       -0.00       -0.00       -0.00        -0.00
   9      -0.00       -0.00       54000.00     -0.00       -0.00       90.00       -0.00       -0.00       -0.00       -0.00        -0.00
  10      -0.00       -0.00       85000.00     -0.00       -0.00      130.00       -0.00       -0.00       -0.00       -0.00        -0.00
  11      -0.00       -0.00       49500.00     -0.00       -0.00       20.00       -0.00       -0.00       -0.00       -0.00        -0.00
  13      -0.00       -0.00       74000.00     -0.00       -0.00       30.00       -0.00       -0.00       -0.00       -0.00        -0.00
                                                                       40.00


  TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1     612.95      -0.00      -0.00      -0.00       0.31      -0.00       2.15      -0.00      -0.00      -0.00       0.00      -0.00
   2     595.16      -0.00      -0.00      -0.00       0.13      -0.00       2.56      -0.00      -0.00      -0.00       0.00      -0.00
   3     455.08      -0.00      -0.00      -0.00       0.35      -0.00       3.46      -0.00      -0.00      -0.00       0.00      -0.00
   4      64.92      -0.00      -0.00      -0.00       2.31      -0.00       0.86      -0.00      -0.00      -0.00       0.03      -0.00
   6     649.97      -0.00      -0.00      -0.00       1.50      -0.00      34.45      -0.00      -0.00      -0.00       0.08      -0.00
   8     649.97      -0.00      -0.00      -0.00       1.50      -0.00      34.45      -0.00      -0.00      -0.00       0.08      -0.00
   9     563.42      -0.00      -0.00      -0.00       2.23      -0.00      28.73      -0.00      -0.00      -0.00       0.11      -0.00
  10     767.60      -0.00      -0.00      -0.00       0.29      -0.00      16.45      -0.00      -0.00      -0.00       0.01      -0.00
  11     486.10      -0.00      -0.00      -0.00       0.48      -0.00       3.16      -0.00      -0.00      -0.00       0.00      -0.00
  13     482.23      -0.00      -0.00      -0.00       0.41      -0.00       1.69      -0.00      -0.00      -0.00       0.00      -0.00


  TEST         CO               CO                THC                NO                 NO                NO
  MODE                            2                                                       2                 x
          LB/1K HP-HR      LB/1K HP-HR       LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2        1.280           -0.000           -0.000              0.000             -0.000             0.000
   3        0.509           -0.000           -0.000              0.000             -0.000             0.000
   4        0.044           -0.000           -0.000              0.002             -0.000             0.002
   6        0.378           -0.000           -0.000              0.001             -0.000             0.001
   8        0.378           -0.000           -0.000              0.001             -0.000             0.001
   9        0.318           -0.000           -0.000              0.001             -0.000             0.001
  10        0.571           -0.000           -0.000              0.000             -0.000             0.001
  11        0.451           -0.000           -0.000              0.000             -0.000             0.000
*****HORSEPOWER-HR BASIS NOT CALCULABLE****                      0.000             -0.000             0.000


                                                          LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED     FUEL       CO         CO          CO          HC         HC          HC          NO         NO          NO
  MODE     MODE    FUEL FLOW     USED     LB/1K      LB/1K     EMISSION     LB/1K      LB/1K     EMISSION      LB/1K      LB/1K     EMISSION
           MIN.      LB/HR       LBS.    LB FUEL     HOURS       LBS.      LB FUEL     HOURS       LBS.      LB FUEL     HOURS       LBS.

   3      12.00       7.60       1.52     455.08     3458.64     0.692      -0.00      -0.00      -0.000        0.35       2.65     0.0005
   6       0.30      53.00       0.26     649.97    34448.53     0.172      -0.00      -0.00      -0.000        1.50      79.57     0.0004
   8       5.00      53.00       4.40     649.97    34448.53     2.859      -0.00      -0.00      -0.000        1.50      79.57     0.0066
  10       6.00      22.00       2.20     747.60    16447.10     1.645      -0.00      -0.00      -0.000        0.29       6.36     0.0006
  11       4.00       6.50       0.44     486.10     3159.68     0.212      -0.00      -0.00      -0.000        0.48       3.15     0.0002
TOTAL FOR CYCLE                  8.819                           5.580                            -0.000                           0.0084

TOTAL FOR CYCLE/LB FUEL                                          0.633                            -0.000                           0.0010

NO MODEL SUMMARY CALCULATED
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DATE:   6/25/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  217    ENGINE TYPE AND MODEL:  O-470-R                    SERIAL NUMBER:     211305

                            RATED HORSEPOWER:   230.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87                FUEL H/C RATIO:    1.840

OPERATIONAL DATA *************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   29.05   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    84.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

 NUMBER OF TESTS:  10

 COMMENTS:


                            TEST             POWER                     MEASURED        AIR FLOW     CALCULATED
                            MODE       SHAFT         PERCENT             FUEL            LB/HR          F/A
                                        HP            RATED              FLOW
                                                                         LB/HR

 COLD START + 130 SEC         1         0.0             0                15.50          94.50        0.16402
 TAXI-IDLE LOW                2         2.00            0                18.00         126.00        0.14286
 TAXI-IDLE HIGH               3         4.60            1                19.70         162.00        0.12160
 RUN-UP                       4        23.90           10                32.00         297.00        0.10774
 TAKE-OFF 100%                6       191.10           83               133.00        1345.50        0.09885
 CLIMB-RICH                   8       152.70           66                88.00        1044.00        0.08429
 CLIMB-LEAN                   9       153.80           66                86.50        1066.50        0.08111
 APPROACH                    10        39.00           16                34.00         373.50        0.09103
 TAXI-IDLE                   11         4.30            1                17.90         139.50        0.12832
 HOT START                   13         0.0             0                14.50          81.00        0.17901


  TEST   EXHAUST    EXHAUST       CO         CO        THC       NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS        GAS        (DRY)        2       (WET)     (DRY)       2         X
           TEMP     PRESSURE     PPMV       (DRY)      PPMV      PPMV     (DRY)     (DRY)
        DEGREES F     PSIA               PERCENT V                         PPMV      PPMV

   1     -0.00      -0.00     64000.00    -0.00  50000.00   110.00    -0.00     -0.00      -0.00      -0.00        -0.00
   2     -0.00      -0.00     69000.00    -0.00  50000.00   125.00    -0.00     -0.00      -0.00      -0.00        -0.00
   3     -0.00      -0.00     97500.00    -0.00  47500.00   100.00    -0.00     -0.00      -0.00      -0.00        -0.00
   4     -0.00      -0.00     88000.00    -0.00   4500.00    90.00    -0.00     -0.00      -0.00      -0.00        -0.00
   6     -0.00      -0.00    120000.00    -0.00   3400.00    92.00    -0.00     -0.00      -0.00      -0.00        -0.00
   8     -0.00      -0.00     57000.00    -0.00   1200.00   350.00    -0.00     -0.00      -0.00      -0.00        -0.00
   9     -0.00      -0.00     53000.00    -0.00   1000.00   415.00    -0.00     -0.00      -0.00      -0.00        -0.00
  10     -0.00      -0.00     61500.00    -0.00   2500.00   120.00    -0.00     -0.00      -0.00      -0.00        -0.00
  11     -0.00      -0.00     83000.00    -0.00  50000.00   115.00    -0.00     -0.00      -0.00      -0.00        -0.00
  13     -0.00      -0.00     99000.00    -0.00  50000.00   160.00    -0.00     -0.00      -0.00      -0.00        -0.00


  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1     372.66    233.52     -0.00     -0.00      1.05     -0.00      5.78      3.62     -0.00     -0.00      0.02     -0.00
   2     463.31    258.31     -0.00     -0.00      1.38     -0.00      8.34      4.65     -0.00     -0.00      0.02     -0.00
   3     767.35    275.93     -0.00     -0.00      1.29     -0.00     15.12      5.44     -0.00     -0.00      0.03     -0.00
   4     776.52     28.53     -0.00     -0.00      1.30     -0.00     24.85      0.91     -0.00     -0.00      0.04     -0.00
   6    1145.91     22.93     -0.00     -0.00      1.44     -0.00    152.41      3.05     -0.00     -0.00      0.19     -0.00
   8     626.54      9.06     -0.00     -0.00      6.32     -0.00     55.14      0.80     -0.00     -0.00      0.56     -0.00
   9     602.12      7.75     -0.00     -0.00      7.74     -0.00     52.08      0.67     -0.00     -0.00      0.67     -0.00
  10     632.14     17.87     -0.00     -0.00      2.03     -0.00     21.49      0.61     -0.00     -0.00      0.07     -0.00
  11     620.06    279.34     -0.00     -0.00      1.41     -0.00     11.10      5.00     -0.00     -0.00      0.03     -0.00
  13     575.01    219.09     -0.00     -0.00      1.39     -0.00      7.61      3.18     -0.00     -0.00      0.02     -0.00


  TEST          CO                CO               THC               NO               NO               NO
  MODE                             2                                                   2                X
          LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2          4.170           -0.000            2.325            0.012           -0.000            0.012
   3          3.296           -0.000            1.182            0.006           -0.000            0.006
   4          1.040           -0.000            0.038            0.002           -0.000            0.002
   6          0.798           -0.000            0.016            0.001           -0.000            0.001
   8          0.361           -0.000            0.005            0.004           -0.000            0.004
   9          0.339           -0.000            0.004            0.004           -0.000            0.004
  10          0.551           -0.000            0.016            0.002           -0.000            0.002
  11          2.581           -0.000            1.163            0.006           -0.000            0.006
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED     FUEL       CO         CO         CO        HC         HC         HC        NO        NO         NO
  MODE     MODE    FUEL FLOW     USED     LB/1K      LB/1K    EMISSION    LB/1K      LB/1K    EMISSION    LB/1K     LB/1K    EMISSION
           MIN.      LB/HR       LBS.    LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.     LB FUEL    HOURS      LBS.

   3      12.00      19.70       3.94     767.35   15116.75     3.023     275.93    5435.76     1.087      1.29     25.47    0.0051
   6       0.30     133.00       0.66    1145.91  152405.88     0.762      22.93    3049.29     0.015      1.44    191.92    0.0010
   8       5.00      88.00       7.30     626.54   55135.82     4.576       9.06     796.89     0.066      6.32    556.09    0.0462
  10       6.00      34.00       3.40     632.14   21492.69     2.149      17.87     607.69     0.061      2.03     68.88    0.0069
  11       4.00      17.90       1.20     620.06   11099.14     0.744     279.34    5000.11     0.335      1.41     25.26    0.0017

 TOTAL FOR CYCLE                16.908                          11.255                          1.564                        0.0608

 TOTAL FOR CYCLE/LB FUEL                                         0.682                          0.095                        0.0037
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DATE:   6/28/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  218    ENGINE TYPE AND MODEL:  O-470-R                      SERIAL NUMBER:     211302A

                            RATED HORSEPOWER:   230.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.53   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:   109.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:



                             TEST               POWER              MEASURED       AIR FLOW     CALCULATED
                             MODE        SHAFT        PERCENT        FUEL          LB/HR          F/A
                                           HP          RATED         FLOW
                                                                     LB/HR

COLD START + 130 SEC           1          0.0            0           15.40          99.00        0.15556
TAXI-IDLE LOW                  2          1.50           0           16.70         117.00        0.14274
TAXI-IDLE HIGH                 3          4.20           1           14.00         153.00        0.09150
RUN-UP                         4         23.10          10           33.00         301.50        0.10945
TAKE-OFF 100%                  6        158.70          68          130.00        1323.00        0.09826
CLIMB-RICH                     8        155.30          67           90.00        1012.50        0.08889
CLIMB-LEAN                     9        156.80          68           86.50        1035.00        0.08357
APPROACH                      10         52.60          22           42.00         495.00        0.08485
TAXI-IDLE                     11          4.00           1           17.10         139.50        0.12258
HOT START                     13          0.0            0           15.50         103.50        0.14976


  TEST   EXHAUST    EXHAUST       CO        CO       THC        NO       NO       NO     ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS        GAS        (DRY)       2      (WET)     (DRY)      2        X
          TEMP     PRESSURE      PPMV      (DRY)     PPMV      PPMV    (DRY)    (DRY)
        DEGREES F    PSIA                PERCENT V                     PPMV     PPMV

   1      -0.00      -0.00     76500.00   -0.00  50000.00    120.00   -0.00    -0.00     -0.00       -0.00        -0.00
   2      -0.00      -0.00     78000.00   -0.00  50000.00    110.00   -0.00    -0.00     -0.00       -0.00        -0.00
   3      -0.00      -0.00     97500.00   -0.00  48000.00     89.00   -0.00    -0.00     -0.00       -0.00        -0.00
   4      -0.00      -0.00    110000.00   -0.00   5000.00     50.00   -0.00    -0.00     -0.00       -0.00        -0.00
   6      -0.00      -0.00    122000.00   -0.00   3000.00     62.00   -0.00    -0.00     -0.00       -0.00        -0.00
   8      -0.00      -0.00     61500.00   -0.00   1500.00    265.00   -0.00    -0.00     -0.00       -0.00        -0.00
   9      -0.00      -0.00     54000.00   -0.00   1300.00    360.00   -0.00    -0.00     -0.00       -0.00        -0.00
  10      -0.00      -0.00     53000.00   -0.00   1600.00    260.00   -0.00    -0.00     -0.00       -0.00        -0.00
  11      -0.00      -0.00     74000.00   -0.00  50000.00     90.00   -0.00    -0.00     -0.00       -0.00        -0.00
  13      -0.00      -0.00     59000.00   -0.00  50000.00    122.00   -0.00    -0.00     -0.00       -0.00        -0.00


  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1      468.01    242.74    -0.00     -0.00      1.21     -0.00      7.21      3.74     -0.00     -0.00      0.02     -0.00
   2      521.10    258.48    -0.00     -0.00      1.21     -0.00      8.70      4.32     -0.00     -0.00      0.02     -0.00
   3      991.86    341.91    -0.00     -0.00      1.49     -0.00     13.89      4.79     -0.00     -0.00      0.02     -0.00
   4      950.98     31.34    -0.00     -0.00      0.71     -0.00     31.38      1.03     -0.00     -0.00      0.02     -0.00
   6     1164.52     20.32    -0.00     -0.00      0.97     -0.00    151.39      2.64     -0.00     -0.00      0.13     -0.00
   8      641.80     10.91    -0.00     -0.00      4.54     -0.00     57.76      0.98     -0.00     -0.00      0.41     -0.00
   9      594.51      9.87    -0.00     -0.00      6.51     -0.00     51.43      0.85     -0.00     -0.00      0.56     -0.00
  10      575.94     12.02    -0.00     -0.00      4.64     -0.00     24.19      0.50     -0.00     -0.00      0.19     -0.00
  11      574.55    288.77    -0.00     -0.00      1.15     -0.00      9.82      4.96     -0.00     -0.00      0.02     -0.00
  13      375.37    249.57    -0.00     -0.00      1.27     -0.00      5.82      3.87     -0.00     -0.00      0.02     -0.00


  TEST         CO                CO                THC               NO                NO                NO
  MODE                            2                                                     2                 X
          LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2         5.802            -0.000             2.878             0.013            -0.000             0.013
   3         3.306            -0.000             1.140             0.005            -0.000             0.005
   4         1.359            -0.000             0.045             0.001            -0.000             0.001
   6         0.954            -0.000             0.017             0.001            -0.000             0.001
   8         0.372            -0.000             0.006             0.003            -0.000             0.003
   9         0.328            -0.000             0.005             0.004            -0.000             0.004
  10         0.460            -0.000             0.010             0.004            -0.000             0.004
  11         2.456            -0.000             1.234             0.005            -0.000             0.005
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                   LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED     FUEL       CO         CO         CO         HC        HC         HC         NO        NO        NO
  MODE     MODE    FUEL FLOW     USED      LB/1K      LB/1K    EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K   EMISSION
           MIN.      LB/HR       LBS.     LB FUEL     HOURS      LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.

   3      12.00      14.00       2.80      991.86   13886.05     2.777     341.91   4786.76     0.957      1.49     20.82    0.0042
   6       0.30     130.00       0.65     1164.52  151388.06     0.757      20.32   2641.04     0.013      0.97    126.37    0.0006
   8       5.00      90.00       7.47      641.80   57762.31     4.794      10.91    981.49     0.081      4.54    408.82    0.0339
  10       6.00      42.00       4.20      575.94   24189.66     2.419      12.02    504.78     0.050      4.64    194.92    0.0195
  11       4.00      17.10       1.15      574.55    9824.86     0.654     288.77   4937.97     0.331      1.15     19.63    0.0013

TOTAL FOR CYCLE                 16.266                           11.405                         1.433                       0.0595

TOTAL FOR CYCLE/LB FUEL                                           0.701                         0.088                       0.0037
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DATE:   6/28/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA *******************************************************************************************

     CAL ID NUMBER:  219    ENGINE TYPE AND MODEL:  O-470-R                    SERIAL NUMBER:    470-R-2113028

                            RATED HORSEPOWER:   230.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87               FUEL H/C RATIO:    1.840

OPERATIONAL DATA **************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.58   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:   114.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  11

COMMENTS:


                           TEST           POWER             MEASURED      AIR FLOW    CALCULATED
                           MODE      SHAFT     PERCENT        FUEL         LB/HR         F/A
                                      HP        RATED         FLOW
                                                              LB/HR

COLD START + 130 SEC        1        0.0          0            8.50         81.00      0.10494
TAXI-IDLE LOW               2        1.60         0            8.80         81.00      0.10864
TAXI-IDLE HIGH              3        4.00         1           12.70        126.00      0.10079
RUN-UP                      4       22.00         9           22.00        252.00      0.08730
TAKE-OFF 100%               6      186.30        80          130.00       1305.00      0.09962
TAKE-OFF TO CLIMB           7      152.90        66           91.00       1026.00      0.08869
CLIMB-RICH                  8      150.60        65           74.00        999.00      0.07407
CLIMB-LEAN                  9      154.00        66           86.50       1039.50      0.08321
APPROACH                   10       37.00        16           32.00        346.50      0.09235
TAXI-IDLE                  11        4.40         1           11.20        117.00      0.09573
HOT START                  13        0.0          0            8.50         72.00      0.11806

  TEST   EXHAUST    EXHAUST      CO         CO        THC        NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS        GAS       (DRY)        2       (WET)     (DRY)       2         X
          TEMP     PRESSURE     PPMV       (DRY)     PPMV      PPMV      (DRY)     (DRY)
        DEGREES F    PSIA               PERCENT V                       PPMV      PPMV

   1     -0.00      -0.00    52000.00    -0.00  20000.00     60.00    -0.00     -0.00     -0.00      -0.00        -0.00
   2     -0.00      -0.00    52000.00    -0.00  20000.00     45.00    -0.00     -0.00     -0.00      -0.00        -0.00
   3     -0.00      -0.00    59000.00    -0.00  10000.00     40.00    -0.00     -0.00     -0.00      -0.00        -0.00
   4     -0.00      -0.00    59000.00    -0.00   2200.00     90.00    -0.00     -0.00     -0.00      -0.00        -0.00
   6     -0.00      -0.00   122000.00    -0.00   3100.00     60.00    -0.00     -0.00     -0.00      -0.00        -0.00
   7     -0.00      -0.00    64000.00    -0.00   1500.00    220.00    -0.00     -0.00     -0.00      -0.00        -0.00
   8     -0.00      -0.00    73000.00    -0.00   1000.00   1050.00    -0.00     -0.00     -0.00      -0.00        -0.00
   9     -0.00      -0.00    53000.00    -0.00   1300.00    335.00    -0.00     -0.00     -0.00      -0.00        -0.00
  10     -0.00      -0.00    71000.00    -0.00   1900.00     80.00    -0.00     -0.00     -0.00      -0.00        -0.00
  11     -0.00      -0.00    52000.00    -0.00   5500.00     48.00    -0.00     -0.00     -0.00      -0.00        -0.00
  13     -0.00      -0.00    52000.00    -0.00   2900.00     40.00    -0.00     -0.00     -0.00      -0.00        -0.00

  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1     466.92    129.22     -0.00     -0.00      0.88     -0.00      3.97      1.10     -0.00     -0.00      0.01     -0.00
   2     452.16    126.04     -0.00     -0.00      0.64     -0.00      3.98      1.11     -0.00     -0.00      0.01     -0.00
   3     549.69     66.50     -0.00     -0.00      0.61     -0.00      6.98      0.84     -0.00     -0.00      0.01     -0.00
   4     624.77     16.20     -0.00     -0.00      1.57     -0.00     13.74      0.36     -0.00     -0.00      0.03     -0.00
   6    1148.84     20.79     -0.00     -0.00      0.93     -0.00    149.35      2.70     -0.00     -0.00      0.12     -0.00
   7     668.41     10.92     -0.00     -0.00      3.77     -0.00     60.83      0.99     -0.00     -0.00      0.34     -0.00
   8     888.81      8.25     -0.00     -0.00     21.00     -0.00     65.77      0.61     -0.00     -0.00      1.55     -0.00
   9     585.01      9.90     -0.00     -0.00      6.07     -0.00     50.60      0.86     -0.00     -0.00      0.53     -0.00
  10     715.57     13.45     -0.00     -0.00      1.32     -0.00     22.90      0.43     -0.00     -0.00      0.04     -0.00
  11     507.58     37.94     -0.00     -0.00      0.77     -0.00      5.68      0.42     -0.00     -0.00      0.01     -0.00
  13     418.09     17.21     -0.00     -0.00      0.53     -0.00      3.55      0.15     -0.00     -0.00      0.00     -0.00

  TEST         CO                CO               THC               NO                NO                NO
  MODE                            2                                                    2                 X
          LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2        2.487            -0.000            0.693            0.004           -0.000            0.004
   3        1.745            -0.000            0.211            0.002           -0.000            0.002
   4        0.625            -0.000            0.016            0.002           -0.000            0.002
   6        0.802            -0.000            0.015            0.001           -0.000            0.001
   7        0.398            -0.000            0.007            0.002           -0.000            0.002
   8        0.437            -0.000            0.004            0.010           -0.000            0.010
   9        0.329            -0.000            0.006            0.003           -0.000            0.003
  10        0.619            -0.000            0.012            0.001           -0.000            0.001
  11        1.292            -0.000            0.097            0.002           -0.000            0.002
*****HORSEPOWER-HR BASIS NOT CALCULABLE****

                                              LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED     FUEL       CO         CO        CO        HC        HC        HC        NO        NO        NO
  MODE     MODE    FUEL FLOW     USED     LB/1K      LB/1K    EMISSION   LB/1K     LB/1K   EMISSION   LB/1K     LB/1K   EMISSION
           MIN.      LB/HR       LBS.    LB FUEL     HOURS      LBS.    LB FUEL    HOURS      LBS.    LB FUEL    HOURS      LBS.

   3      12.00      12.70       2.54    549.69    6981.07     1.396     66.50    844.56     0.169      0.61      7.77    0.0016
   6       0.30     130.00       0.65   1148.84  149349.50     0.747     20.79   2702.54     0.014      0.93    120.65    0.0006
   8       5.00      74.00       6.14    888.81   65771.75     5.459      8.25    610.64     0.051     21.00   1553.91    0.1290
  10       6.00      32.00       3.20    715.57   22898.30     2.290     13.45    430.27     0.043      1.32     42.38    0.0042
  11       4.00      11.20       0.75    507.58    5684.90     0.381     37.94    424.98     0.028      0.77      8.62    0.0006

TOTAL FOR CYCLE                 13.282                         10.273                         0.305                        0.1359

TOTAL FOR CYCLE/LB FUEL                                         0.773                         0.023                        0.0102
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DATE:   6/29/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  221    ENGINE TYPE AND MODEL:  O-470-R                     SERIAL NUMBER:     470-R-3113028

                            RATED HORSEPOWER:   230.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.77   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:   103.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   9

COMMENTS:


                               TEST              POWER                 MEASURED      AIR FLOW    CALCULATED
                               MODE       SHAFT       PERCENT            FUEL         LB/HR         F/A
                                           HP          RATED             FLOW
                                                                         LB/HR

COLD START + 130 SEC             1          0.0           0               9.80         81.00        0.12095
TAXI-IDLE LOW                    2          1.90          0              10.70         94.50        0.11323
TAXI-IDLE HIGH                   3          4.90          2              14.10        126.00        0.11190
RUN-UP                           4         24.00         10              30.00        283.50        0.10582
TAKE-OFF 100%                    6        193.60         84             132.00       1341.00        0.09843
CLIMB-RICH                       8        158.00         68              90.00       1039.50        0.08658
APPROACH                        10         38.90         16              33.00        360.00        0.09167
TAXI-IDLE                       11          5.00          2              14.80        117.00        0.12650
HOT START                       13          1.40          0               8.90         76.50        0.11634


  TEST   EXHAUST    EXHAUST       CO         CO        THC        NO        NO        NO      ALDEHYDES    SMOKE     PARTICULATES
  MODE     GAS        GAS        (DRY)        2       (WET)      (DRY)       2         X
          TEMP     PRESSURE      PPMV       (DRY)      PPMV       PPMV     (DRY)     (DRY)
        DEGREES F    PSIA                 PERCENT V                         PPMV      PPMV

    1    -0.00      -0.00     61500.00    -0.00   32500.00     60.00     -0.00     -0.00      -0.00       -0.00        -0.00
    2    -0.00      -0.00     71000.00    -0.00   30000.00     55.00     -0.00     -0.00      -0.00       -0.00        -0.00
    3    -0.00      -0.00     78000.00    -0.00   13220.00     50.00     -0.00     -0.00      -0.00       -0.00        -0.00
    4    -0.00      -0.00     78000.00    -0.00    3300.00     60.00     -0.00     -0.00      -0.00       -0.00        -0.00
    6    -0.00      -0.00    122000.00    -0.00    2600.00     70.00     -0.00     -0.00      -0.00       -0.00        -0.00
    8    -0.00      -0.00     57000.00    -0.00    1300.00    320.00     -0.00     -0.00      -0.00       -0.00        -0.00
   10    -0.00      -0.00     54000.00    -0.00    1900.00    100.50     -0.00     -0.00      -0.00       -0.00        -0.00
   11    -0.00      -0.00     71000.00    -0.00   12000.00     40.00     -0.00     -0.00      -0.00       -0.00        -0.00
   13    -0.00      -0.00     57000.00    -0.00   37500.00     70.00     -0.00     -0.00      -0.00       -0.00        -0.00


  TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE       CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
           LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HP     LB/HR     LB/HR     LB/HR
          LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    1     484.23    189.49     -0.00     -0.00      0.78     -0.00      4.75      1.86     -0.00     -0.00      0.01     -0.00
    2     595.44    183.51     -0.00     -0.00      0.76     -0.00      6.37      1.96     -0.00     -0.00      0.01     -0.00
    3     661.42     81.55     -0.00     -0.00      0.70     -0.00      9.33      1.15     -0.00     -0.00      0.01     -0.00
    4     696.77     21.19     -0.00     -0.00      0.88     -0.00     20.90      0.64     -0.00     -0.00      0.03     -0.00
    6    1164.30     17.58     -0.00     -0.00      1.10     -0.00    153.69      2.32     -0.00     -0.00      0.14     -0.00
    8     609.50      9.63     -0.00     -0.00      5.62     -0.00     54.86      0.87     -0.00     -0.00      0.51     -0.00
   10     549.23     13.52     -0.00     -0.00      1.68     -0.00     18.12      0.45     -0.00     -0.00      0.06     -0.00
   11     535.46     67.74     -0.00     -0.00      0.50     -0.00      7.92      1.00     -0.00     -0.00      0.01     -0.00
   13     465.92    224.93     -0.00     -0.00      0.94     -0.00      4.15      2.00     -0.00     -0.00      0.01     -0.00


  TEST          CO                CO                THC               NO                NO                NO
  MODE                             2                                                     2                 X
            LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
    2         3.353            -0.000             1.033             0.004            -0.000             0.004
    3         1.903            -0.000             0.235             0.002            -0.000             0.002
    4         0.871            -0.000             0.026             0.001            -0.000             0.001
    6         0.794            -0.000             0.012             0.001            -0.000             0.001
    8         0.347            -0.000             0.005             0.003            -0.000             0.003
   10         0.466            -0.000             0.011             0.001            -0.000             0.001
   11         1.585            -0.000             0.201             0.001            -0.000             0.001
   13         2.962            -0.000             1.430             0.006            -0.000             0.006


                                             LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED     FUEL       CO         CO         CO         HC        HC        HC         NO        NO        NO
  MODE     MODE     FUEL FLOW    USED      LB/1K      LB/1K     EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION
           MIN.      LB/HR       LBS.     LB FUEL     HOURS       LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.

    3      12.00     14.10       2.82     661.42    9325.96     1.865      81.55    1149.92     0.230      0.70       9.62    0.0020
    6       0.30    132.00       0.66    1164.30  153686.94     0.763      17.58    2321.21     0.012      1.10     144.84    0.0007
    8       5.00     90.00       7.47     609.50   54855.38     4.553       9.63     866.50     0.072      5.62     505.64    0.0420
   10       6.00     33.00       3.30     549.23   18124.65     1.812      13.52     446.06     0.045      1.68      55.41    0.0055
   11       4.00     14.80       0.99     535.46    7924.86     0.531      67.74    1002.56     0.067      0.50       7.33    0.0005

  TOTAL FOR CYCLE               15.242                          9.530                          0.425                         0.0507

  TOTAL FOR CYCLE/LB FUEL                                       0.625                          0.028                         0.0033
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DATE:  6/21/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ************************************************************************************************************

    CAL ID NUMBER:  210    ENGINE TYPE AND MODEL:  IO-520-P                    SERIAL NUMBER:    159950A

                           RATED HORSEPOWER:   300.

    ENGINE TOTAL TIME:     -0. HRS

    FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840

OPERATIONAL DATA *******************************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

    ATMOSPHERIC PRESSURE:              START   28.96   FINISH   -0.00

    INLET AIR HUMIDITY, GRN H2O/LB AIR:    63.00

    RELATIVE HUMIDITY:                     -0.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

    SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:



                             TEST              POWER              MEASURED      AIR FLOW    CALCULATED
                             MODE       SHAFT         PERCENT       FUEL         LB/HR         F/A
                                         HP            RATED        FLOW
                                                                    LB/HR

COLD START + 130 SEC           1         0.0             0          10.60         81.00       0.13086
TAXI-IDLE LOW                  2         1.90            0          11.00         85.50       0.12865
TAXI-IDLE HIGH                 3         4.60            1          16.00        130.50       0.12261
RUN-UP                         4        24.00            7          36.00        306.00       0.11765
TAKE-OFF 100%                  6       263.70           87         145.00       1566.00       0.09259
CLIMB-RICH                     8       202.10           67         110.00       1188.00       0.09259
CLIMB-LEAN                     9       202.90           67          92.00       1183.50       0.07774
APPROACH                      10        35.40           11          45.00        378.00       0.11905
TAXI-IDLE                     11         4.60            1          16.00        117.00       0.13675
HOT START                     13         0.0             0          10.50         81.00       0.12963


 TEST   EXHAUST     EXHAUST       CO          CO        THC        NO         NO         NO      ALDEHYDES    SMOKE     PARTICULATES
 MODE     GAS         GAS        (DRY)         2        (WET)      (DRY)        2          X
         TEMP       PRESSURE     PPMV        (DRY)      PPMV       PPMV       (DRY)      (DRY)
       DEGREES F     PSIA                  PERCENT V                          PPMV       PPMV

   1     -0.00       -0.00     74000.00     -0.00      -0.00      47.00      -0.00      -0.00      -0.00      -0.00        -0.00
   2     -0.00       -0.00     69000.00     -0.00      -0.00      35.00      -0.00      -0.00      -0.00      -0.00        -0.00
   3     -0.00       -0.00     59000.00     -0.00      -0.00      25.00      -0.00      -0.00      -0.00      -0.00        -0.00
   4     -0.00       -0.00     54000.00     -0.00      -0.00      30.00      -0.00      -0.00      -0.00      -0.00        -0.00
   6     -0.00       -0.00     61500.00     -0.00      -0.00     460.00      -0.00      -0.00      -0.00      -0.00        -0.00
   8     -0.00       -0.00     61500.00     -0.00      -0.00     470.00      -0.00      -0.00      -0.00      -0.00        -0.00
   9     -0.00       -0.00     10000.00     -0.00      -0.00      -0.00      -0.00      -0.00      -0.00      -0.00        -0.00
  10     -0.00       -0.00     81000.00     -0.00      -0.00      -0.00      -0.00      -0.00      -0.00      -0.00        -0.00
  11     -0.00       -0.00     59000.00     -0.00      -0.00      30.00      -0.00      -0.00      -0.00      -0.00        -0.00
  13     -0.00       -0.00     81000.00     -0.00      -0.00      25.00      -0.00      -0.00      -0.00      -0.00        -0.00


 TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 MODE      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
         LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
        LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1     544.96     -0.00      -0.00      -0.00       0.57      -0.00       5.78      -0.00      -0.00      -0.00       0.01      -0.00
   2     516.70     -0.00      -0.00      -0.00       0.43      -0.00       5.68      -0.00      -0.00      -0.00       0.00      -0.00
   3     462.98     -0.00      -0.00      -0.00       0.32      -0.00       7.41      -0.00      -0.00      -0.00       0.01      -0.00
   4     440.84     -0.00      -0.00      -0.00       0.40      -0.00      15.87      -0.00      -0.00      -0.00       0.01      -0.00
   6     625.75     -0.00      -0.00      -0.00       7.69      -0.00      90.73      -0.00      -0.00      -0.00       1.11      -0.00
   8     625.75     -0.00      -0.00      -0.00       7.85      -0.00      68.83      -0.00      -0.00      -0.00       0.86      -0.00
   9     118.33     -0.00      -0.00      -0.00      -0.00      -0.00      10.89      -0.00      -0.00      -0.00      -0.00      -0.00
  10     653.84     -0.00      -0.00      -0.00      -0.00      -0.00      29.42      -0.00      -0.00      -0.00      -0.00      -0.00
  11     415.98     -0.00      -0.00      -0.00       0.35      -0.00       6.66      -0.00      -0.00      -0.00       0.01      -0.00
  13     602.09     -0.00      -0.00      -0.00       0.31      -0.00       6.32      -0.00      -0.00      -0.00       0.00      -0.00


 TEST         CO                CO               THC               NO                NO                NO
 MODE                            2                                                    2                 X
         LB/1K HP-HR       LB/1K HP-HR      LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2        2.991            -0.000           -0.000             0.002            -0.000             0.002
   3        1.610            -0.000           -0.000             0.001            -0.000             0.001
   4        0.661            -0.000           -0.000             0.001            -0.000             0.001
   6        0.344            -0.000           -0.000             0.004            -0.000             0.004
   8        0.341            -0.000           -0.000             0.004            -0.000             0.004
   9        0.054            -0.000           -0.000            -0.000            -0.000            -0.000
  10        0.831            -0.000           -0.000            -0.000            -0.000            -0.000
  11        1.447            -0.000           -0.000             0.001            -0.000             0.001
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                      LTO CYCLE EMISSIONS

 TEST   TIME IN   MEASURED    FUEL       CO         CO         CO         HC         HC         HC         NO         NO         NO
 MODE    MODE    FUEL FLOW    USED      LB/1K      LB/1K    EMISSION    LB/1K      LB/1K    EMISSION    LB/1K      LB/1K    EMISSION
         MIN.      LB/HR      LBS.     LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.

   3     12.00     16.00      3.20     462.98    7407.62     1.482      -0.00      -0.00     -0.000      0.32       5.16    0.0010
   6      0.30    145.00      0.72     625.75   90733.19     0.454      -0.00      -0.00     -0.000      7.69    1114.73    0.0056
   8      5.00    110.00      9.13     625.75   68832.06     5.713      -0.00      -0.00     -0.000      7.85     864.04    0.0717
  10      6.00     45.00      4.50     653.84   29422.80     2.942      -0.00      -0.00     -0.000     -0.00      -0.00   -0.0000
  11      4.00     16.00      1.07     415.98    6655.64     0.446      -0.00      -0.00     -0.000      0.35       5.56    0.0004

TOTAL FOR CYCLE                18.627                          11.036                           -0.000                           -0.0000

TOTAL FOR CYCLE/LB FUEL                                        0.[illegible]                    -0.000                           -0.0000
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DATE:   6/21/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************************************

     CAL ID NUMBER:  211    ENGINE TYPE AND MODEL:  IO-520-P                 SERIAL NUMBER:     159850B

                            RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.96   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    63.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:


                                  TEST            POWER              MEASURED      AIR FLOW    CALCULATED
                                  MODE      SHAFT       PERCENT        FUEL         LB/HR         F/A
                                             HP          RATED         FLOW
                                                                       LB/HR

COLD START + 130 SEC                1         0.0          0           10.80         81.00       0.13333
TAXI-IDLE LOW                       2         1.90         0           12.30         85.50       0.14386
TAXI-IDLE HIGH                      3         4.80         1           15.20        121.50       0.12510
RUN-UP                              4        24.20         8           37.00        310.50       0.11916
TAKE-OFF 100%                       6       264.20        88          145.00       1633.50       0.08877
CLIMB-RICH                          8       202.30        67          111.00       1197.00       0.09273
CLIMB-LEAN                          9       203.30        67           92.00       1192.50       0.07715
APPROACH                           10        35.80        11           48.00        369.00       0.13008
TAXI-IDLE                          11         4.50         1           14.50        112.50       0.12889
HOT START                          13         0.0          0           10.50         81.00       0.12963


 TEST   EXHAUST    EXHAUST      CO          CO         THC        NO         NO         NO      ALDEHYDES     SMOKE     PARTICULATES
 MODE     GAS        GAS       (DRY)         2        (WET)      (DRY)        2          X
         TEMP     PRESSURE     PPMV       (DRY)       PPMV       PPMV      (DRY)      (DRY)
       DEGREES F    PSIA               PERCENT V                           PPMV       PPMV

   1     -0.00      -0.00    76500.00     -0.00      -0.00      55.00      -0.00      -0.00      -0.00       -0.00        -0.00
   2     -0.00      -0.00    69000.00     -0.00      -0.00      35.00      -0.00      -0.00      -0.00       -0.00        -0.00
   3     -0.00      -0.00    62000.00     -0.00      -0.00      42.00      -0.00      -0.00      -0.00       -0.00        -0.00
   4     -0.00      -0.00    52000.00     -0.00      -0.00      47.00      -0.00      -0.00      -0.00       -0.00        -0.00
   6     -0.00      -0.00    54000.00     -0.00      -0.00     410.00      -0.00      -0.00      -0.00       -0.00        -0.00
   8     -0.00      -0.00    59000.00     -0.00      -0.00     410.00      -0.00      -0.00      -0.00       -0.00        -0.00
   9     -0.00      -0.00     8000.00     -0.00      -0.00      -0.00      -0.00      -0.00      -0.00       -0.00        -0.00
  10     -0.00      -0.00    62000.00     -0.00      -0.00      35.00      -0.00      -0.00      -0.00       -0.00        -0.00
  11     -0.00      -0.00    59000.00     -0.00      -0.00      42.00      -0.00      -0.00      -0.00       -0.00        -0.00
  13     -0.00      -0.00    78000.00     -0.00      -0.00      55.00      -0.00      -0.00      -0.00       -0.00        -0.00


 TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
         LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
        LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1     553.09     -0.00     -0.00     -0.00      0.65     -0.00      5.97     -0.00     -0.00     -0.00      0.01     -0.00
   2     462.35     -0.00     -0.00     -0.00      0.39     -0.00      5.69     -0.00     -0.00     -0.00      0.00     -0.00
   3     477.12     -0.00     -0.00     -0.00      0.53     -0.00      7.25     -0.00     -0.00     -0.00      0.01     -0.00
   4     419.36     -0.00     -0.00     -0.00      0.62     -0.00     15.52     -0.00     -0.00     -0.00      0.02     -0.00
   6     570.25     -0.00     -0.00     -0.00      7.11     -0.00     82.69     -0.00     -0.00     -0.00      1.03     -0.00
   8     599.51     -0.00     -0.00     -0.00      6.84     -0.00     66.55     -0.00     -0.00     -0.00      0.76     -0.00
   9      95.27     -0.00     -0.00     -0.00     -0.00     -0.00      8.76     -0.00     -0.00     -0.00     -0.00     -0.00
  10     459.29     -0.00     -0.00     -0.00      0.43     -0.00     22.05     -0.00     -0.00     -0.00      0.02     -0.00
  11     441.03     -0.00     -0.00     -0.00      0.52     -0.00      6.39     -0.00     -0.00     -0.00      0.01     -0.00
  13     579.79     -0.00     -0.00     -0.00      0.67     -0.00      6.09     -0.00     -0.00     -0.00      0.01     -0.00


 TEST        CO               CO               THC               NO                NO                NO
 MODE                          2                .                                   2                 X
        LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2        2.993           -0.000           -0.000            0.002            -0.000             0.002
   3        1.511           -0.000           -0.000            0.002            -0.000             0.002
   4        0.641           -0.000           -0.000            0.001            -0.000             0.001
   6        0.313           -0.000           -0.000            0.004            -0.000             0.004
   8        0.329           -0.000           -0.000            0.004            -0.000             0.004
   9        0.043           -0.000           -0.000           -0.000            -0.000            -0.000
  10        0.616           -0.000           -0.000            0.001            -0.000             0.001
  11        1.421           -0.000           -0.000            0.002            -0.000             0.002
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                  LTO CYCLE EMISSIONS

 TEST    TIME IN   MEASURED    FUEL       CO         CO         CO        HC        HC        HC        NO        NO        NO
 MODE     MODE    FUEL FLOW    USED     LB/1K      LB/1K    EMISSION   LB/1K     LB/1K   EMISSION   LB/1K     LB/1K   EMISSION
          MIN.      LB/HR      LBS.    LB FUEL     HOURS      LBS.    LB FUEL    HOURS      LBS.    LB FUEL    HOURS      LBS.

   3     12.00      15.20      3.04     477.12    7252.21     1.450     -0.00     -0.00    -0.000      0.53      8.07    0.0016
   6      0.30     145.00      0.72     570.25   82686.63     0.413     -0.00     -0.00    -0.000      7.11   1031.21    0.0052
   8      5.00     111.00      9.21     599.51   66545.63     5.523     -0.00     -0.00    -0.000      6.84    759.58    0.0630
  10      6.00      48.00      4.80     459.29   22045.99     2.205     -0.00     -0.00    -0.000      0.43     20.44    0.0020
  11      4.00      14.50      0.97     441.03    6394.95     0.428     -0.00     -0.00    -0.000      0.52      7.48    0.0005

TOTAL FOR CYCLE                18.749                          10.020                       -0.000                        0.0724

TOTAL FOR CYCLE/LB FUEL                                         0.534                       -0.000                        0.0039
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DATE:   6/22/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ***********************************************************************************

     CAL ID NUMBER:  212    ENGINE TYPE AND MODEL:  IO-520-P                 SERIAL NUMBER:     159977A

                            RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840

OPERATIONAL DATA ******************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.94   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    63.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:    9

COMMENTS:



                              TEST           POWER              MEASURED      AIR FLOW    CALCULATED
                              MODE      SHAFT      PERCENT        FUEL         LB/HR          F/A
                                         HP         RATED         FLOW
                                                                  LB/HR

COLD START + 130 SEC           1         0.0         0           11.50         81.00       0.14198
TAXI-IDLE HIGH                 3         4.60        1           18.10        144.00       0.12569
RUN-UP                         4        23.60        7           39.00        315.00       0.12381
TAKE-OFF 100%                  6       261.40       87          154.00       1597.50       0.09640
CLIMB-RICH                     8       200.00       66          123.00       1192.50       0.10314
CLIMB-LEAN                     9       204.80       68           92.00       1183.50       0.07774
APPROACH                      10        37.30       12           46.00        396.00       0.11616
TAXI-IDLE                     11         4.20        1           14.60        117.00       0.12479
HOT START                     13         0.0         0            8.10         67.50       0.12000


  TEST    EXHAUST     EXHAUST       CO          CO       THC         NO         NO        NO      ALDEHYDES    SMOKE    PARTICULATES
  MODE      GAS         GAS        (DRY)        2       (WET)       (DRY)       2         X
           TEMP      PRESSURE      PPMV       (DRY)     PPMV        PPMV      (DRY)     (DRY)
         DEGREES F     PSIA                 PERCENT V                          PPMV      PPMV

   1      -0.00       -0.00      87500.00    -0.00   47500.00     145.00     -0.00     -0.00      -0.00       -0.00         -0.00
   3      -0.00       -0.00      52000.00    -0.00   42500.00     177.00     -0.00     -0.00      -0.00       -0.00         -0.00
   4      -0.00       -0.00     116000.00    -0.00    9000.00     125.00     -0.00     -0.00      -0.00       -0.00         -0.00
   6      -0.00       -0.00      87500.00    -0.00    2400.00     205.00     -0.00     -0.00      -0.00       -0.00         -0.00
   8      -0.00       -0.00      97500.00    -0.00    2400.00     175.00     -0.00     -0.00      -0.00       -0.00         -0.00
   9      -0.00       -0.00       9000.00    -0.00    1300.00    2250.00     -0.00     -0.00      -0.00       -0.00         -0.00
  10      -0.00       -0.00     122000.00    -0.00   11000.00      55.00     -0.00     -0.00      -0.00       -0.00         -0.00
  11      -0.00       -0.00      54000.00    -0.00   37500.00      60.00     -0.00     -0.00      -0.00       -0.00         -0.00
  13      -0.00       -0.00      73500.00    -0.00   45000.00      60.00     -0.00     -0.00      -0.00       -0.00         -0.00


  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1     594.18    246.51     -0.00     -0.00      1.62     -0.00      6.83      2.83     -0.00     -0.00      0.02     -0.00
   3     398.34    241.02     -0.00     -0.00      2.23     -0.00      7.21      4.36     -0.00     -0.00      0.04     -0.00
   4     901.71     51.60     -0.00     -0.00      1.60     -0.00     35.17      2.01     -0.00     -0.00      0.06     -0.00
   6     858.84     16.48     -0.00     -0.00      3.31     -0.00    132.26      2.54     -0.00     -0.00      0.51     -0.00
   8     900.07     15.70     -0.00     -0.00      2.65     -0.00    110.71      1.93     -0.00     -0.00      0.33     -0.00
   9     106.50     10.38     -0.00     -0.00     43.73     -0.00      9.80      0.95     -0.00     -0.00      4.02     -0.00
  10    1008.09     66.05     -0.00     -0.00      0.75     -0.00     46.37      3.04     -0.00     -0.00      0.03     -0.00
  11     416.58    213.79     -0.00     -0.00      0.76     -0.00      6.08      3.12     -0.00     -0.00      0.01     -0.00
  13     548.79    263.93     -0.00     -0.00      0.79     -0.00      4.77      2.14     -0.00     -0.00      0.01     -0.00


  TEST          CO                CO              THC             NO              NO              NO
  MODE                            2                                               2               X
           LB/1K HP-HR       LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   3          1.567            -0.000           0.948           0.009          -0.000           0.009
   4          1.490            -0.000           0.085           0.003          -0.000           0.003
   6          0.506            -0.000           0.010           0.002          -0.000           0.002
   8          0.554            -0.000           0.010           0.002          -0.000           0.002
   9          0.048            -0.000           0.005           0.020          -0.000           0.020
  10          1.243            -0.000           0.081           0.001          -0.000           0.001
  11          1.448            -0.000 -         0.743           0.003          -0.000           0.003
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                          LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL      CO        CO        CO        HC        HC        HC        NO        NO        NO
  MODE     MODE    FUEL FLOW    USED     LB/1K     LB/1K   EMISSION    LB/1K     LB/1K   EMISSION    LB/1K     LB/1K   EMISSION
           MIN.      LB/HR      LBS.    LB FUEL    HOURS     LBS.     LB FUEL    HOURS     LBS.     LB FUEL    HOURS     LBS.

   3      12.00      18.10      3.62    398.34    7209.88    1.442    241.02   4362.54    0.873      2.23     40.31    0.0081
   6       0.30     154.00      0.77    858.84  132261.56    0.661     16.48   2537.19    0.013      3.31    508.98    0.0025
   8       5.00     123.00     10.21    900.07  110708.69    9.189     15.70   1930.99    0.160      2.65    326.39    0.0271
  10       6.00      46.00      4.60   1008.09   46372.05    4.637     66.05   3038.48    0.304      0.75     34.34    0.0034
  11       4.00      14.60      0.98    416.58    6082.04    0.407    213.79   3121.36    0.209      0.76     11.10    0.0007

TOTAL FOR CYCLE                20.177                       16.337                        1.558                        0.0419

TOTAL FOR CYCLE/LB FUEL                                      0.810                        0.077                        0.0021
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DATE:   6/22/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:  213    ENGINE TYPE AND MODEL:  IO-520-P                    SERIAL NUMBER:     1599778

                            RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:      -0. HRS

     FUEL: AV GAS 100/130           FUEL H/C RATIO:    1.840

OPERATIONAL DATA *******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.94   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    63.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:



                                TEST           POWER               MEASURED      AIR FLOW    CALCULATED
                                MODE      SHAFT      PERCENT         FUEL         LB/HR         F/A
                                           HP         RATED          FLOW
                                                                     LB/HR

COLD START + 130 SEC             1         0.0          0             9.60         76.50       0.12549
TAXI-IDLE LOW                    2         2.60         0            10.50         81.00       0.12963
TAXI-IDLE HIGH                   3         6.10         2            17.20        135.00       0.12741
RUN-UP                           4        26.60         8            37.00        315.00       0.11746
TAKE-OFF 100%                    6       262.80        87           152.00       1548.00       0.09819
CLIMB-RICH                       8       206.20        68           123.00       1206.00       0.10199
CLIMB-LEAN                       9       209.20        69            92.00       1188.00       0.07744
APPROACH                        10        40.00        13            46.00        391.50       0.11750
TAXI-IDLE                       11         5.70         1            14.20        117.00       0.12137
HOT START                       13         0.0          0            10.00         67.50       0.14815


  TEST   EXHAUST    EXHAUST       CO        CO       THC        NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS        GAS       (DRY)        2      (WET)     (DRY)        2         X
          TEMP     PRESSURE     PPMV      (DRY)     PPMV      PPMV      (DRY)     (DRY)
        DEGREES F    PSIA               PERCENT V                       PPMV      PPMV

   1     -0.00      -0.00      9500.00    -0.00  50000.00    295.00    -0.00     -0.00      -0.00      -0.00       -0.00
   2     -0.00      -0.00     84500.00    -0.00  50000.00    112.00    -0.00     -0.00      -0.00      -0.00       -0.00
   3     -0.00      -0.00     59000.00    -0.00  42500.00     95.00    -0.00     -0.00      -0.00      -0.00       -0.00
   4     -0.00      -0.00    117000.00    -0.00   9500.00     68.00    -0.00     -0.00      -0.00      -0.00       -0.00
   6     -0.00      -0.00     89000.00    -0.00   2500.00    215.00    -0.00     -0.00      -0.00      -0.00       -0.00
   8     -0.00      -0.00     92500.00    -0.00   2300.00    190.00    -0.00     -0.00      -0.00      -0.00       -0.00
   9     -0.00      -0.00      8300.00    -0.00   1200.00   2825.00    -0.00     -0.00      -0.00      -0.00       -0.00
  10     -0.00      -0.00    122000.00    -0.00   1100.00     87.00    -0.00     -0.00      -0.00      -0.00       -0.00
  11     -0.00      -0.00     52000.00    -0.00  50000.00    100.00    -0.00     -0.00      -0.00      -0.00       -0.00
  13     -0.00      -0.00     74000.00    -0.00  50000.00    110.00    -0.00     -0.00      -0.00      -0.00       -0.00


  TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  MODE      CO         HC        NO2        CO2         NO        NOX         CO         HC        NO2        CO2         NO        NOX
          LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
         LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   1      72.89     283.89      -0.00      -0.00       3.72      -0.00       0.70       2.73      -0.00      -0.00       0.04      -0.00
   2     628.11     277.27      -0.00      -0.00       1.37      -0.00       6.60       2.91      -0.00      -0.00       0.01      -0.00
   3     446.04     238.66      -0.00      -0.00       1.06      -0.00       7.67       4.11      -0.00      -0.00       0.02      -0.00
   4     956.61      56.59      -0.00      -0.00       0.91      -0.00      35.39       2.09      -0.00      -0.00       0.03      -0.00
   6     849.56      16.94      -0.00      -0.00       3.41      -0.00     129.13       2.57      -0.00      -0.00       0.52      -0.00
   8     862.75      15.17      -0.00      -0.00       2.91      -0.00     106.12       1.87      -0.00      -0.00       0.36      -0.00
   9      98.53       9.60      -0.00      -0.00      55.08      -0.00       9.06       0.88      -0.00      -0.00       5.07      -0.00
  10     997.19       6.55      -0.00      -0.00       1.17      -0.00      45.87       0.30      -0.00      -0.00       0.05      -0.00
  11     412.05     290.86      -0.00      -0.00       1.30      -0.00       5.85       4.13      -0.00      -0.00       0.02      -0.00
  13     491.27     251.55      -0.00      -0.00       1.18      -0.00       4.81       2.52      -0.00      -0.00       0.01      -0.00


  TEST          CO                 CO                 THC                 NO                 NO                 NO
  MODE                              2                                                          2                  X
          LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR

*****HORSEPOWER-HP BASIS NOT CALCULABLE****
   2         2.537             -0.000              1.120              0.006             -0.000              0.006
   3         1.258             -0.000              0.673              0.003             -0.000              0.003
   4         1.331             -0.000              0.079              0.001             -0.000              0.001
   6         0.491             -0.000              0.010              0.002             -0.000              0.002
   8         0.515             -0.000              0.009              0.002             -0.000              0.002
   9         0.043             -0.000              0.004              0.024             -0.000              0.024
  10         1.147             -0.000              0.008              0.001             -0.000              0.001
  11         1.027             -0.000              0.725              0.003             -0.000              0.003
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                  LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL       CO        CO        CO         HC        HC        HC         NO        NO        NO
  MODE     MODE    FUEL FLOW    USED     LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION
           MIN.      LB/HR      LBS.    LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.

   3      12.00      17.20      3.44    446.04    7671.91     1.534    238.66    4105.03     0.821      1.06      18.15    0.0036
   6       0.30     152.00      0.76    849.56  129132.56     0.646     16.94    2574.63     0.013      3.41     518.22    0.0026
   8       5.00     123.00     10.21    862.75  106118.31     8.808     15.17    1865.50     0.155      2.91     356.03    0.0297
  10       6.00      46.00      4.60    997.19   45870.94     4.587      6.55     301.35     0.030      1.17      53.73    0.0054
  11       4.00      14.20      0.95    412.05    5851.16     0.392    290.86    4130.23     0.277      1.30      18.48    0.0012

TOTAL FOR CYCLE                19.960                        15.967                         1.296                         0.0426

TOTAL FOR CYCLE/LB FUEL                                       0.800                         0.065                         0.0021
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DATE:   6/23/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:  214    ENGINE TYPE AND MODEL:  IO-520-P                    SERIAL NUMBER:     159982A

                            RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.60   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    85.00

     RELATIVE HUMIDITY:                    -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:


                            TEST              POWFR                  MEASURED     AIR FLOW    CALCULATED
                            MODE       SHAFT        PERCFNT            FUEL        LB/HR          F/A
                                        HP           RATED             FLOW
                                                                       LB/HR

COLD START + 130 SEC          1         0.0            0              10.00        81.00       0.12346
TAXI-IDLE LOW                 2         2.30           0              10.50        99.00       0.10606
TAXI-IDLE HIGH                3         5.40           1              14.30       130.50       0.10958
RUN-UP                        4        25.40           8              31.00       288.00       0.10764
TAKE-OFF 100%                 6       259.80          86             144.00      1534.50       0.09384
CLIMB-RICH                    8       205.90          68             112.00      1206.00       0.09287
CLIMB-LEAN                    9       207.70          69              92.00      1188.00       0.07744
APPROACH                     10        32.30          10              34.50       306.00       0.11275
TAXI-IDLE                    11         5.00           1              13.00       112.50       0.11556
HOT START                    13         0.0            0               8.30        63.00       0.13175


  TEST   EXHAUST     EXHAUST       CO         CO        THC        NO         NO         NO      ALDEHYDES     SMOKE     PARTICULATES
  MODE     GAS         GAS        (DRY)        2        (WET)     (DRY)        2          X
          TEMP      PRESSURE      PPMV      (DRY)       PPMV      PPMV      (DRY)      (DRY)
        DEGREES F     PSIA                PERCENT V                          PPMV       PPMV

   1      -0.00       -0.00     52000.00    -0.00  20000.00    100.00     -0.00      -0.00      -0.00       -0.00         -0.00
   2      -0.00       -0.00     90000.00    -0.00  10000.00    150.00     -0.00      -0.00      -0.00       -0.00         -0.00
   3      -0.00       -0.00     78000.00    -0.00   3500.00    110.00     -0.00      -0.00      -0.00       -0.00         -0.00
   4      -0.00       -0.00     54000.00    -0.00   2900.00    140.00     -0.00      -0.00      -0.00       -0.00         -0.00
   6      -0.00       -0.00     66500.00    -0.00   2000.00    310.00     -0.00      -0.00      -0.00       -0.00         -0.00
   8      -0.00       -0.00     57000.00    -0.00   2000.00    420.00     -0.00      -0.00      -0.00       -0.00         -0.00
   9      -0.00       -0.00      8000.00    -0.00   1600.00   2875.00     -0.00      -0.00      -0.00       -0.00         -0.00
  10      -0.00       -0.00     81000.00    -0.00   3600.00    115.00     -0.00      -0.00      -0.00       -0.00         -0.00
  11      -0.00       -0.00     53000.00    -0.00   7500.00     85.00     -0.00      -0.00      -0.00       -0.00         -0.00
  13      -0.00       -0.00     66500.00    -0.00  37500.00     90.00     -0.00      -0.00      -0.00       -0.00         -0.00


  TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE       CO        HC        NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO       NOX
           LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
          LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   1      403.23    114.91     -0.00     -0.00      1.27     -0.00      4.03      1.15     -0.00     -0.00      0.01     -0.00
   2      805.64     64.12     -0.00     -0.00      2.21     -0.00      8.46      0.67     -0.00     -0.00      0.02     -0.00
   3      677.39     21.92     -0.00     -0.00      1.57     -0.00      9.69      0.31     -0.00     -0.00      0.02     -0.00
   4      476.82     18.40     -0.00     -0.00      2.03     -0.00     14.78      0.57     -0.00     -0.00      0.06     -0.00
   6      665.20     13.99     -0.00     -0.00      5.09     -0.00     95.79      2.02     -0.00     -0.00      0.73     -0.00
   8      575.48     14.10     -0.00     -0.00      6.97     -0.00     64.45      1.58     -0.00     -0.00      0.78     -0.00
   9       94.49     12.81     -0.00     -0.00     55.78     -0.00      8.69      1.18     -0.00     -0.00      5.13     -0.00
  10      684.91     22.09     -0.00     -0.00      1.60     -0.00     23.63      0.76     -0.00     -0.00      0.06     -0.0C
  11      437.85     45.21     -0.00     -0.00      1.15     -0.00      5.69      0.59     -0.00     -C.00      0.01     -0.00
  13      483.98    205.52     -0.00     -0.00      1.08     -0.00      4.02      1.71     -0.00     -0.00      0.01     -0.00


  TEST          CO                 CO                 THC                NO                 NU                 NO
  MODE                              2                                                        2                  X
            LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
   2          3.678             -0.000              0.293              0.010             -0.000              0.010
   3          1.794             -0.000              0.058              0.004             -0.000              0.004
   4          0.582             -0.000              0.022              0.002             -0.000              0.002
   6          0.369             -0.000              0.008              0.003             -0.000              0.003
   8          0.313             -0.000              0.008              0.004             -0.000              0.004
   9          0.042             -0.000              0.006              0.025             -0.000              0.025
  10          0.732             -0.000              0.024              0.002             -0.000              0.002
  11          1.138             -0.000              0.118              0.003             -0.000              0.003
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                    LTO CYCLE EMISSIONS

  TEST    TIMF IN   MEASURED    FUEL       CO        CO        CO         HC        HC        HC         NO        NO        NO
  MODE     MODE    FUEL FLOW    USED     LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION    LB/1K     LB/1K    EMISSION
           MIN.      LB/HR      LBS.    LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.     LB FUEL    HOURS      LBS.

   3      12.00      14.30      2.86    677.39    9686.64     1.937     21.92    313.47     0.063      1.57      22.44    0.0045
   6       0.30     144.00      0.72    665.20   95788.94     0.479     13.99   2015.16     0.010      5.09     733.46    0.0037
   8       5.00     112.00      9.30    575.48   64453.72     5.350     14.10   1578.95     0.131      6.97     780.09    0.0647
  10       6.00      34.50      3.45    684.91   23629.47     2.363     22.09    762.07     0.076      1.60      55.10    0.0055
  11       4.00      13.00      0.87    437.85    5692.07     0.381     45.21    587.70     0.039      1.15      14.99    0.0010

TOTAL FOR CYCLE                17.197                       10.510                        0.319                          0.0794

TOTAL FOR CYCLE/LB FUFL                                      0.611                        0.019                          0.0046
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DATE:   6/23/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  215    ENGINE TYPE AND MODEL:  IO-520-P                  SERIAL NUMBER:      1599828

                            RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 100/130             FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHFRIC PRESSURE:              START   28.60   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:    85.00

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:


                              TEST              POWER                MEASURED        AIR FLOW     CALCJLATED
                              MODE       SHAFT         PERCENT         FUEL           LB/HR          F/A
                                          HP            RATED          FLOW
                                                                       LB/HR

COLD START + 130 SEC            1         0.0             0             8.10           63.00        0.12857
TAXI-IDLF LOW                   2         1.80            0            10.30           81.00        0.12716
TAXI-IDLE HIGH                  3         4.80            1            13.40          121.50        0.11029
RUN-UP                          4        23.50            7            30.50          279.00        0.10932
TAKE-OFF 100%                   6       263.00           87           146.00         1561.50        0.09350
CLIMB-RICH                      8       207.30           69           112.00         1224.00        0.09150
CLIMB-LEAN                      9       209.50           69            92.00         1210.50        0.07600
APPROACH                       10        38.00           12            37.00          360.00        0.10278
TAXI-IDLF                      11         5.00            1            12.80          117.00        0.10940
HOT START                      13         0.0             0             7.50           63.00        0.11905


  TEST   FXHAUST    EXHAUST       CO          CO        THC        NO         NO         NO      ALDEHYDES     SMOKE     PARTICULATES
  MODE     GAS        GAS        (DRY)         2        (WET)      (DRY)        2          X
          TEMP     PRESSURE      PPMV        (DRY)      PPMV       PPMV       (DRY)      (DRY)
        DEGREES F    PSIA                  PERCENT V                           PPMV       PPMV

    1     -0.00      -0.00     10000.00     -0.00  35000.00     165.00      -0.00      -0.00      -0.00       -0.00         -0.00
    2     -0.00      -0.00     54000.00     -0.00  22500.00     208.00      -0.00      -0.00      -0.00       -0.00         -0.00
    3     -0.00      -0.00     66500.00     -0.00   7500.00      70.00      -0.00      -0.00      -0.00       -0.00         -0.00
    4     -0.00      -0.00     66500.00     -0.00  33000.00      90.00      -0.00      -0.00      -0.00       -0.00         -0.00
    6     -0.00      -0.00     71500.00     -0.00   2300.00     295.00      -0.00      -0.00      -0.00       -0.00         -0.00
    8     -0.00      -0.00     57000.00     -0.00   2000.00     400.00      -0.00      -0.00      -0.00       -0.00         -0.00
    9     -0.00      -0.00     10000.00     -0.00   1500.00    2625.00      -0.00      -0.00      -0.00       -0.00         -0.00
   10     -0.00      -0.00     83000.00     -0.00   3800.00     115.00      -0.00      -0.00      -0.00       -0.00         -0.00
   11     -0.00      -0.00     52000.00     -0.00   7500.00      75.00      -0.00      -0.00      -0.00       -0.00         -0.00
   13     -0.00      -0.00     66500.00     -0.00  37500.00      80.00      -0.00      -0.00      -0.00       -0.00         -0.00


  TEST   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
          LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
         LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    1     74.54    195.25     -0.00     -0.00      2.02     -0.00      0.60      1.58     -0.00     -0.00      0.02     -0.00
    2    406.90    126.53     -0.00     -0.00      2.57     -0.00      4.19      1.30     -0.00     -0.00      0.03     -0.00
    3    574.05     46.76     -0.00     -0.00      0.99     -0.00      7.69      0.63     -0.00     -0.00      0.01     -0.00
    4    578.79    207.04     -0.00     -0.00      1.29     -0.00     17.65      6.31     -0.00     -0.00      0.04     -0.00
    6    717.54     16.13     -0.00     -0.00      4.86     -0.00    104.76      2.36     -0.00     -0.00      0.71     -0.00
    8    583.08     14.25     -0.00     -0.00      6.72     -0.00     65.31      1.60     -0.00     -0.00      0.75     -0.00
    9    119.98     12.16     -0.00     -0.00     51.73     -0.00     11.04      1.12     -0.00     -0.00      4.76     -0.00
   10    764.78     24.92     -0.00     -0.00      1.74     -0.00     28.30      0.92     -0.00     -0.00      0.06     -0.00
   11    452.27     47.03     -0.00     -0.00      1.07     -0.00      5.79      0.60     -0.00     -0.00      0.01     -0.00
   13    534.03    221.22     -0.00     -0.00      1.06     -0.00      4.01      1.66     -0.00     -0.00      0.01     -0.00


  TEST          CO                CO               THC               NO               NO               NO
  MODE                             2                                                                    X
           LB/1K HP-HR       LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
    2         2.328            -0.000            0.724            0.015           -0.000            0.015
    3         1.603            -0.000            0.131            0.003           -0.000            0.003
    4         0.751            -0.000            0.269            0.002           -0.000            0.002
    6         0.398            -0.000            0.009            0.003           -0.000            0.003
    8         0.315            -0.000            0.008            0.004           -0.000            0.004
    9         0.053            -0.000            0.005            0.023           -0.000            0.023
   10         0.745            -0.000            0.024            0.002           -0.000            0.002
   11         1.158            -0.000            0.120            0.003           -0.000            0.003
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                                  LTO CYCLE EMISSIONS

  TEST   TIME IN   MEASURED    FUEL      CO        CO         CO        HC        HC        HC        NO        NO        NO
  MODE    MODE    FUEL FLOW    USED     LB/1K     LB/1K    EMISSION    LB/1K     LB/1K   EMISSION    LB/1K     LB/1K   EMISSION
          MIN.      LB/HR      LBS.    LB FUEL    HOURS      LBS.     LB FUEL    HOURS     LBS.     LB FUEL    HOURS     LBS.

    3     12.00     13.40      2.68    574.05   7692.21     1.538     46.76    626.52     0.125      0.99      13.30   0.0027
    6      0.30    146.00      0.73    717.54 104761.31     0.524     16.13   2355.70     0.012      4.86     709.97   0.0035
    8      5.00    112.00      9.30    583.08  65305.23     5.420     14.25   1595.59     0.132      6.72     752.75   0.0625
   10      6.00     37.00      3.70    764.78  28295.92     2.830     24.92    922.05     0.092      1.74      64.40   0.0064
   11      4.00     12.80      0.86    452.27   5789.10     0.388     47.03    601.96     0.040      1.07      13.71   0.0009

TOTAL FOR CYCLE                  17.264                        10.700                        0.402                         0.0760

TOTAL FOR CYCLE/LB FUEL                                         0.620                        0.023                         0.0044
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DATE:   6/24/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************

     CAL ID NUMBER:  216    ENGINE TYPE AND MODEL:  IO-520-P                SERIAL NUMBER:     159983

                            RATED HORSEPOWER:   300.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 100/130            FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.76   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:     83.00

     RELATIVE HUMIDITY:                      -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:  10

COMMENTS:


                              TEST             POWER                MEASURED      AIR FLOW    CALCULATED
                              MODE        SHAFT       PERCENT         FUEL         LB/HR          F/A
                                           HP          RATED          FLOW
                                                                      LB/HR

COLD START + 130 SEC            1          0.0           0            10.50         90.00       0.11667
TAXI-IDLE LOW                   2          1.70          0            11.30        108.00       0.10463
TAXI-IDLE HIGH                  3          4.80          1            16.00        148.50       0.10774
RUN-UP                          4         23.70          7            34.50        306.00       0.11275
TAKE-OFF 100%                   6        255.70         85           150.00       1534.50       0.09775
CLIMB-RICH                      8        201.60         67           117.00       1174.50       0.09962
CLIMB-LEAN                      9        204.80         68            92.00       1161.00       0.07924
APPROACH                       10         35.80         11            43.00        387.00       0.11111
TAXI-IDLE                      11          4.00          1            13.30        126.00       0.10556
HOT START                      13          0.0           0             8.70         63.00       0.13810


  TEST   EXHAUST     EXHAUST       CO         CO        THC        NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
  MODE     GAS         GAS       (DRY)        2        (WET)     (DRY)       2         X
           TEMP      PRESSURE    PPMV       (DRY)      PPMV      PPMV      (DRY)     (DRY)
         DEGREES F     PSIA               PERCENT V                        PPMV      PPMV

    1     -0.00       -0.00     54000.00    -0.00  42500.00     90.00     -0.00     -0.00      -0.00      -0.00        -0.00
    2     -0.00       -0.00     67000.00    -0.00  36500.00     90.00     -0.00     -0.00      -0.00      -0.00        -0.00
    3     -0.00       -0.00     81000.00    -0.00  23000.00    105.00     -0.00     -0.00      -0.00      -0.00        -0.00
    4     -0.00       -0.00     76000.00    -0.00   7500.00    125.00     -0.00     -0.00      -0.00      -0.00        -0.00
    6     -0.00       -0.00     99000.00    -0.00   2600.00    160.00     -0.00     -0.00      -0.00      -0.00        -0.00
    8     -0.00       -0.00     76000.00    -0.00   2400.00    250.00     -0.00     -0.00      -0.00      -0.00        -0.00
    9     -0.00       -0.00     61500.00    -0.00   1600.00   2100.00     -0.00     -0.00      -0.00      -0.00        -0.00
   10     -0.00       -0.00    116000.00    -0.00   9500.00     80.00     -0.00     -0.00      -0.00      -0.00        -0.00
   11     -0.00       -0.00     88000.00    -0.00  42500.00    108.00     -0.00     -0.00      -0.00      -0.00        -0.00
   13     -0.00       -0.00      9000.00    -0.00  50000.00    116.00     -0.00     -0.00      -0.00      -0.00        -0.00


  TEST    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  MODE       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
           LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
          LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    1     442.29    254.41     -0.00     -0.00      1.21     -0.00      4.64      2.67     -0.00     -0.00      0.01     -0.00
    2     607.60    236.32     -0.00     -0.00      1.34     -0.00      6.87      2.67     -0.00     -0.00      0.02     -0.00
    3     714.92    145.81     -0.00     -0.00      1.52     -0.00     11.44      2.33     -0.00     -0.00      0.02     -0.00
    4     642.93     46.02     -0.00     -0.00      1.74     -0.00     22.18      1.59     -0.00     -0.00      0.06     -0.00
    6     955.17     17.67     -0.00     -0.00      2.54     -0.00    143.28      2.65     -0.00     -0.00      0.38     -0.00
    8     720.83     16.09     -0.00     -0.00      3.89     -0.00     84.34      1.88     -0.00     -0.00      0.46     -0.00
    9     712.77     12.60     -0.00     -0.00     39.98     -0.00     65.58      1.16     -0.00     -0.00      3.68     -0.00
   10     994.87     58.91     -0.00     -0.00      1.13     -0.00     42.78      2.53     -0.00     -0.00      0.05     -0.00
   11     791.59    273.44     -0.00     -0.00      1.60     -0.00     10.53      3.64     -0.00     -0.00      0.02     -0.00
   13      62.54    264.78     -0.00     -0.00      1.32     -0.00      0.54      2.30     -0.00     -0.00      0.01     -0.00


  TEST        CO                 CO                THC                NO                 NO                NO
  MODE                           2                                                       2                 X
         LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
    2        4.039            -0.000             1.571             0.009             -0.000             0.009
    3        2.383            -0.000             0.486             0.005             -0.000             0.005
    4        0.936            -0.000             0.067             0.003             -0.000             0.003
    6        0.560            -0.000             0.010             0.001             -0.000             0.001
    8        0.418            -0.000             0.009             0.002             -0.000             0.002
    9        0.320            -0.000             0.006             0.018             -0.000             0.018
   10        1.195            -0.000             0.071             0.001             -0.000             0.001
   11        2.632            -0.000             0.909             0.005             -0.000             0.005
*****HORSEPOWER-HR BASIS NOT CALCULABLE****


                                               LTO CYCLE EMISSIONS

  TEST    TIME IN   MEASURED    FUEL       CO        CO         CO        HC        HC        HC        NO        NO        NO
  MODE     MODE     FUEL FLOW   USED     LB/1K     LB/1K     EMISSION   LB/1K     LB/1K    EMISSION   LB/1K     LB/1K    EMISSION
           MIN.      LB/HR      LBS.    LB FUEL    HOURS       LBS.    LB FUEL    HOURS      LBS.    LB FUEL    HOURS      LBS.

    3     12.00      16.00      3.20    714.92   11438.64     2.288    145.81   2333.00     0.467      1.52     24.36   0.0049
    6      0.30     150.00      0.75    955.17  143275.38     0.716     17.67   2650.84     0.013      2.54    380.34   0.0019
    8      5.00     117.00      9.71    720.83   84337.63     7.000     16.09   1883.06     0.156      3.89    455.69   0.0378
   10      6.00      43.00      4.30    994.87   42779.22     4.278     58.91   2533.01     0.253      1.13     48.46   0.0048
   11      4.00      13.30      0.89    791.59   10528.16     0.705    273.44   3636.72     0.244      1.60     21.22   0.0014

TOTAL FOR CYCLE                18.852                        14.987                         1.133                        0.0509

TOTAL FOR CYCLE/LB FUEL                                       0.795                         0.060                        0.0027
```

SUMMARY O-470-R – CLIMB RICH MODE

```
MODEL SUMMARY            SAMPLE NUMBER =  4.

 TEST               MEASURED    FUEL       CO         CO         CO        HC         HC        HC        NO        NO        NO
 MODE               FUEL FLOW   USED     LB/1K      LB/1K     EMISSION   LB/1K      LB/1K    EMISSION   LB/1K     LB/1K    EMISSION
                      LB/HR     LBS.    LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.    LB FUEL    HOURS      LBS.

   3         MEAN:    15.12     3.02    742.58   11327.45     2.265     191.47    3054.25   0.6108      1.02     15.97    0.0032
          STD DEV:     3.12     0.62    188.46    3821.09     0.764     138.40    2393.21   0.4786      0.43      8.54    0.0017

   6         MEAN:   131.25     0.66   1155.89  151707.56     0.759      20.40    2678.52   0.0134      1.11    145.95    0.0007
          STD DEV:     1.51     0.01      9.92    1834.17     0.009       2.20     298.41   0.0015      0.23     32.34    0.0002

   8         MEAN:    85.50     7.10    691.66   58381.31     4.846       9.46     813.88   0.0676      9.37    756.17    0.0628
          STD DEV:     7.72     0.64    132.09    5097.82     0.423       1.12     155.41   0.0129      7.79    535.33    0.0444

  10         MEAN:    35.25     3.52    618.22   21676.36     2.168      14.21     497.20   0.0497      2.42     90.40    0.0090
          STD DEV:     4.57     0.46     73.52    2611.55     0.261       2.54      80.33   0.0080      1.51     70.51    0.0071

  11         MEAN:    15.25     1.02    559.42    8633.44     0.578     168.45    2841.40   0.1904      0.96     15.21    0.0010
          STD DEV:     3.00     0.20     48.88    2359.03     0.158     134.10    2468.20   0.1654      0.40      8.68    0.0006

TOTAL FOR CYCLE        MEAN:  15.324                         10.616                         0.932                         0.0767
                    STD DEV:   1.468                          0.881                         0.659                         0.0397

TOTAL FOR CYCLE/LB FUEL                              MEAN:    0.695                         0.058                         0.0052
                                                  STD DEV:    0.061                         0.038                         0.0033
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SUMMARY IO-520-P – CLIMB RICH MODE

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MODEL SUMMARY            SAMPLE NUMBER =  5.

 TEST               MEASURED    FUEL       CO         CO         CO        HC         HC        HC        NO        NO        NO
 MODE               FUEL FLOW   USED     LB/1K      LB/1K     EMISSION   LB/1K      LB/1K    EMISSION   LB/1K     LB/1K    EMISSION
                      LB/HR     LBS.    LB FUEL     HOURS      LBS.     LB FUEL     HOURS      LBS.    LB FUEL    HOURS      LBS.

   3         MEAN:    15.80     3.16    562.15    6739.86     1.748     138.84    2348.11   0.4696      1.47     23.71    0.0047
          STD DEV:     1.96     0.39    138.81    1785.97     0.357     103.20    1887.36   0.3775      0.50     10.21    0.0020

   6         MEAN:   149.20     0.75    809.26  121043.94     0.605      16.24    2426.70   0.0121      3.84    570.19    0.0029
          STD DEV:     4.15     0.02    116.76   19927.34     0.100       1.38     254.34   0.0013      1.09    148.90    0.0007

   8         MEAN:   117.40     9.74    728.44   86184.69     7.153      15.06    1770.82   0.1470      4.63    534.59    C.0444
          STD DEV:     5.51     0.46    151.72   21853.98     1.814       0.88     169.37   0.0141      2.08    217.15    0.0180

  10         MEAN:    41.30     4.13    889.97   37389.69     3.739      35.70    1511.39   0.1511      1.28     51.21    0.0051
          STD DEV:     5.29     0.53    153.44   10650.04     1.065      25.55    1198.83   0.1199      0.40     11.04    0.0011

  11         MEAN:    13.58     0.91    502.07    6788.50     0.455     174.07    2415.59   0.1618      1.18     15.90    0.0011
          STD DEV:     0.78     0.05    162.66    2095.45     0.140     120.25    1699.98   C.1139      0.31      3.99    0.0003

TOTAL FOR CYCLE        MEAN:  18.690                         13.700                         0.942                         0.0582
                    STD DEV:   1.424                          2.869                         0.552                         0.0183

TOTAL FOR CYCLE/LB FUEL                              MEAN:    0.727                         0.049                         0.0032
                                                  STD DEV:    0.102                         0.026                         0.0012
```

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DATE:   6/28/71

TEST ORGANIZATION:  TELEDYNE-CONTINENTAL

ENGINE SUPPLIER:  TELEDYNE-CONTINENTAL

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  220    ENGINE TYPE AND MODEL:  O-470-R                   SERIAL NUMBER: :  470-R-511302A

                            RATED HORSEPOWER:   230.

     ENGINE TOTAL TIME:     -0. HRS

     FUEL: AV GAS 80/87              FUEL H/C RATIO:    1.840

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   -0.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   28.53   FINISH   -0.00

     INLET AIR HUMIDITY, GRN H2O/LB AIR:   114.00

     RELATIVE HUMIDITY:                    -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:


                               TEST              POWER                MEASURED      AIR FLOW    CALCULATED
                               MODE       SHAFT        PERCENT          FUEL         LB/HR          F/A
                                           HP           RATED           FLOW
                                                                        LB/HR

COLD START + 130 SEC            1          0.0            0              7.80         72.00       0.10833
TAXI-IDLE LOW                   2          1.90           0              8.30         81.00       0.10247
TAXI-IDLE HIGH                  3          5.00           2             13.00        117.00       0.11111
RUN-UP                          4         24.00          10             21.50        261.00       0.08238
TAKE-OFF 100%                   6        189.60          82            130.00       1318.50       0.09860


   TEST   EXHAUST    EXHAUST      CO         CO        THC         NO         NO         NO       ALDEHYDES     SHOKE     PARTICULATES
   MODE     GAS        GAS       (DRY)        2        (WET)      (DRY)        2          X
            TEMP     PRESSURE    PPMV       (DRY)      PPMV       PPMV       (DRY)      (DRY)
          DEGREES F    PSIA               PERCENT V                          PPMV       PPMV

    1      -0.00      -0.00     49000.00    -0.00  23500.00      73.00      -0.00      -0.00      -0.00       -0.00         -0.00
    2      -0.00      -0.00     31000.00    -0.00  20000.00      69.00      -0.00      -0.00      -0.00       -0.00         -0.00
    3      -0.00      -0.00     69000.00    -0.00   2700.00      80.00      -0.00      -0.00      -0.00       -0.00         -0.00
    4      -0.00      -0.00     78000.00    -0.00   2000.00     145.00      -0.00      -0.00      -0.00       -0.00         -0.00
    6      -0.00      -0.00    122000.00    -0.00   2500.00     100.50      -0.00      -0.00      -0.00       -0.00         -0.00


   TEST   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
   MODE      CO         HC         NO2        CO2        NO         NOX         CO         HC        NO2        CO2         NO         NOX
           LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
          LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    1     427.20     148.40      -0.00      -0.00       1.05      -0.00       3.33       1.16      -0.00      -0.00       0.01      -0.00
    2     284.51     131.44      -0.00      -0.00       1.04      -0.00       2.36       1.09      -0.00      -0.00       0.01      -0.00
    3     587.51      16.74      -0.00      -0.00       1.12      -0.00       7.64       0.22      -0.00      -0.00       0.01      -0.00
    4     868.45      15.34      -0.00      -0.00       2.65      -0.00      18.67       0.33      -0.00      -0.00       0.06      -0.00
    6    1159.60      16.89      -0.00      -0.00       1.57      -0.00     150.75       2.20      -0.00      -0.00       0.20      -0.00


   TEST          CO                 CO               THC               NO                NO                NO
   MODE                              2                                                    2                 X
             LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR

*****HORSEPOWER-HR BASIS NOT CALCULABLE****
    2          1.243            -0.000             0.574             0.005            -0.000             0.005
    3          1.528            -0.000             0.044             0.003            -0.000             0.003
    4          0.778            -0.000             0.014             0.002            -0.000             0.002
    6          0.795            -0.000             0.012             0.001            -0.000             0.001
```

TABLE III

AUXILIARY POWER UNITS

AIRESEARCH MFG.

CONTENTS:

III-2 TO III-54 INDIVIDUAL ENGINE RUNS – MASS EMISSION CONVERSIONS ONLY (INCLUDES AIR HORSEPOWER CALCULATED DATA)

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DATE:   5/17/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ************************************************************************************************************

     CAL ID NUMBER:   35    ENGINE TYPE AND MODEL:  GTCP30-92                   SERIAL NUMBER:    P-28794

                            RATED SHAFT HORSEPOWER:     40.

     ENGINE TOTAL TIME:                                 0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       0. HRS
          N2 COMPRESSOR OVERHAUL:                       0. HRS
          COMBUSTOR CAN REPLACEMENT:                    0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                          0. HRS
          N2 TURBINE OVERHAUL:                          0. HRS

     FUEL: AV KEROS              FUEL H/C RATIO:   1.928

OPERATIONAL DATA *******************************************************************************************************

     INLET AIR TEMPERATURE, DEGRFES F:  START   95.00   FINISH   95.00

     ATMOSPHERIC PRESSURE:              START   28.56   FINISH   28.56

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0012

     RELATIVE HUMIDITY:                    5.00  PERCENT

     SAMPLF LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLF LINE TRANSPORT TIMF, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY



   TEST          POWER                  ENGINE            CORRECTED  GAS GEN     F/A       COMPRESSOR     COMPRESSOR    BLEED
   MODE     SHAFT          AIR          SPEED               FUEL     AIR FLOW    CALC        INLET        DISCHARGE     FLOW
             HP            HP            RPM                FLOW     LB/SEC      FROM        TEMP         PRESSURE      LB/MIN
                                   N1           N2          LB/HR               FMISSIONS   DEGREES F       PSIA

   1/ 0      0.0           0.0    59200.00     -0.00        35.40     -0.00     0.008600      83.00         39.30         0.0
   6/ 1     10.20          0.0    59200.00     -0.00        37.40     -0.00     0.009300      96.00         39.30         0.0
  11/ 6     20.30          0.0    59100.00     -0.00        40.40     -0.00     0.009900     100.00         39.40         0.0
  16/11     30.50          0.0    59100.00     -0.00        43.40     -0.00     0.010600      96.00         39.60         0.0
  20/16     40.70          0.0    59100.00     -0.00        47.40     -0.00     0.011400      98.00         39.70         0.0


 POWER    FXHAUST     EXHAUST        CO        CO        THC       NO        NO        NO     ALDFHYDES   SMOKE    PARTICULATFS
PERCENT     GAS         GAS        (WET)        2       (WET)     (WET)       2         X
 RATED     TEMP      PRESSURE      PPMV      (WET)      PPMV      PPMV     (WET)     (WET)
  SHP    DEGREES F     PSIA                 PERCENT V                       PPMV      PPMV

   0      640.00      -0.00       331.40     1.72      52.60      7.70      5.10     12.70     -0.00      -0.00       -0.00
  25      675.00      -0.00       266.30     1.88      24.50      9.20      5.10     14.30     -0.00      -0.00       -0.00
  50      710.00      -0.00       224.50     2.02      13.50     11.30      5.00     16.30     -0.00      -0.00       -0.00
  76      745.00      -0.00       193.00     2.15       9.70     14.00      5.20     19.20     -0.00      -0.00       -0.00
 101      795.00      -0.00       170.30     2.32       6.60     16.30      5.30     21.60     -0.00      -0.00       -0.00


 POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0      37.14      3.37     -0.00    3030.00    -0.00      2.34      1.31      0.12     -0.00     107.26    -0.00      0.08
  25      27.47      1.44     -0.00    3050.00    -0.00      2.43      1.03      0.05     -0.00     114.07    -0.00      0.09
  50      21.65      0.75     -0.00    3050.00    -0.00      2.58      0.37      0.03     -0.00     123.22    -0.00      0.10
  76      17.49      0.50     -0.00    3060.00    -0.00      2.86      0.76      0.02     -0.00     132.80    -0.00      0.12
 101      14.30      0.32     -0.00    3060.00    -0.00      2.98      0.68      0.02     -0.00     145.04    -0.00      0.14


 POWER        CO               CO              THC              NO               NO               NO
PERCENT                         2                                                 2                X
 RATED   LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR
  SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
  25       100.738        11183.324          5.298           -0.000           -0.000            8.903
  50        43.083         6069.949          1.485           -0.000           -0.000            5.133
  76        24.892         4354.227          0.713           -0.000           -0.000            4.064
 101        16.654         3563.733          0.370           -0.000           -0.000            3.469
```

DATE: 5/17/71

TEST ORGANIZATION: AIRESEARCH

ENGINE SUPPLIER: AIRESEARCH

ENGINE DATA **

CAL ID NUMBER: 80 ENGINE TYPE AND MODEL: GTCP30-92 SERIAL NUMBER: P-28794

RATED SHAFT HORSEPOWER: 40.

ENGINE TOTAL TIME: 0. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	0. HRS
N2 COMPRESSOR OVERHAUL:	0. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	0. HRS
N1 TURBINE OVERHAUL:	0. HRS
N2 TURBINE OVERHAUL:	0. HRS

FUEL: AV KEROS FUEL H/C RATIO: 1.928

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 98.00 FINISH 98.00

ATMOSPHERIC PRESSURE: START 28.56 FINISH 28.56

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0012

RELATIVE HUMIDITY: 5.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: -0.00

SAMPLE LINE TRANSPORT TIME, SEC: -0.00

NUMBER OF TESTS: 5

COMMENTS:

COMBINATION SHP/BLEED LOADING

TEST MODE	POWER SHAFT HP	POWER AIR HP	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	CORRECTED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	F/A CALC FROM EMISSIONS	COMPRESSOR INLET TEMP DEGREES F	COMPRESSOR DISCHARGE PRESSURE PSIA	BLEED FLOW LB/MIN
22/ 0	40.60	24.30	58900.00	-0.00	69.00	-0.00	0.020100	97.00	37.00	25.51
19/22	30.40	25.74	58900.00	-0.00	69.00	-0.00	0.019900	98.00	36.40	27.52
15/19	20.30	27.00	59000.00	-0.00	67.50	-0.00	0.019800	99.00	35.80	29.43
10/15	10.20	27.79	59000.00	-0.00	65.50	-0.00	0.019500	98.00	35.10	31.13
5/10	0.0	28.62	59000.00	-0.00	64.00	-0.00	0.019100	98.00	34.70	32.54

POWER PERCENT RATED SHP	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
101	1318.00	-0.00	107.00	4.07	4.90	41.80	4.10	45.90	-0.00	-0.00	-0.00
75	1320.00	-0.00	111.50	4.02	4.90	40.40	3.90	44.30	-0.00	-0.00	-0.00
50	1320.00	-0.00	111.50	4.00	3.80	39.20	3.50	42.70	-0.00	-0.00	-0.00
25	1320.00	-0.00	121.30	3.94	3.50	37.60	3.70	41.30	-0.00	-0.00	-0.00
0	1320.00	-0.00	123.90	3.88	3.20	36.00	4.30	40.30	-0.00	-0.00	-0.00

POWER PERCENT RATED SHP	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
101	5.04	0.13	-0.00	3020.00	-0.00	3.55	0.35	0.01	-0.00	208.38	-0.00	0.25
75	5.32	0.13	-0.00	3020.00	-0.00	3.47	0.37	0.01	-0.00	208.38	-0.00	0.24
50	5.35	0.10	-0.00	3020.00	-0.00	3.36	0.36	0.01	-0.00	203.85	-0.00	0.23
25	5.91	0.10	-0.00	3020.00	-0.00	3.31	0.39	0.01	-0.00	197.81	-0.00	0.22
0	6.14	0.09	-0.00	3020.00	-0.00	3.28	0.39	0.01	-0.00	193.28	-0.00	0.21

POWER PERCENT RATED SHP	CO LB/1K HP-HR	CO_2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO_2 LB/1K HP-HR	NO_x LB/1K HP-HR
101	5.361	3210.677	0.141	-0.000	-0.000	3.777
75	6.544	3712.036	0.163	-0.000	-0.000	4.270
50	7.636	4309.762	0.150	-0.000	-0.000	4.802
25	10.195	5206.340	0.171	-0.000	-0.000	5.705
0	13.738	6752.922	0.201	-0.000	-0.000	7.339

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DATE:   5/18/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA *****************************************************************************************

     CAL ID NUMBER:  153    ENGINE TYPE AND MODEL:  GTCP30-92              SERIAL NUMBER:   P-28794

                            RATED SHAFT HORSEPOWER:    40.

     ENGINE TOTAL TIME:                                0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      0. HRS
          N2 COMPRESSOR OVERHAUL:                      0. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
          N1 TURBINE OVERHAUL:                         0. HRS
          N2 TURBINE OVERHAUL:                         0. HRS

     FUEL: AV KEROS              FUEL H/C RATIO:   1.928

OPERATIONAL DATA ************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   85.00   FINISH   85.00

     ATMOSPHERIC PRESSURE:              START   28.84   FINISH   28.84

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0020

     RELATIVE HUMIDITY:                     15.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY



   TEST          POWER                  ENGINE              CORRECTED  GAS GEN    F/A        COMPRESSOR     COMPRESSOR    BLEED
   MODE     SHAFT          AIR           SPEED                FUEL     AIR FLOW   CALC        INLET         DISCHARGE     FLOW
             HP            HP             RPM                 FLOW     LB/SEC     FROM        TEMP          PRESSURE      LB/MIN
                                    N1            N2          LB/HR               EMISSIONS  DEGREES F        PSIA

   1/ 0      0.0           0.0     59200.00      -0.00        36.40     -0.00     0.008600     82.00          40.20        0.0
   6/ 1     10.20          0.0     59200.00      -0.00        39.40     -0.00     0.009400     85.00          40.20        0.0
  11/ 6     20.40          0.0     59200.00      -0.00        42.40     -0.00     0.009900     85.00          40.30        0.0
  16/11     30.50          0.0     59000.00      -0.00        46.40     -0.00     0.010300     83.00          40.50        0.0
  20/16     40.60          0.0     58900.00      -0.00        50.30     -0.00     0.010900     88.00          40.50        0.0


 POWER    EXHAUST     EXHAUST        CO         CO        THC       NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
PERCENT     GAS         GAS        (WET)         2       (WET)     (WET)       2         X
 RATED      TEMP      PRESSURE      PPMV      (WET)       PPMV      PPMV     (WET)     (WET)
  SHP    DEGREES F      PSIA                 PERCENT V                        PPMV      PPMV

   0       610.00      -0.00       234.50      1.74       7.30     12.00      7.20     19.20     -0.00       -0.00        -0.00
  25       650.00      -0.00       257.10      1.90       5.30     13.10      7.60     20.80     -0.00       -0.00        -0.00
  50       695.00      -0.00       271.40      2.01       5.60     14.00      8.00     22.10     -0.00       -0.00        -0.00
  76       765.00      -0.00       309.50      2.08       7.10     15.90      8.60     24.50     -0.00       -0.00        -0.00
 101       850.00      -0.00       332.80      2.20       6.50     16.60      9.60     26.20     -0.00       -0.00        -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0       26.19      0.47     -0.00   3060.00     -0.00      3.52      0.95      0.02     -0.00    111.38     -0.00      0.13
  25       26.25      0.31     -0.00   3050.00     -0.00      3.48      1.03      0.01     -0.00    120.17     -0.00      0.14
  50       26.21      0.31     -0.00   3050.00     -0.00      3.50      1.11      0.01     -0.00    129.32     -0.00      0.15
  76       28.87      0.38     -0.00   3040.00     -0.00      3.76      1.34      0.02     -0.00    141.06     -0.00      0.17
 101       29.22      0.33     -0.00   3040.00     -0.00      3.78      1.47      0.02     -0.00    152.91     -0.00      0.19


 POWER         CO                 CO               THC               NO                NO                NO
PERCENT                            2                                                    2                 X
 RATED    LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
  SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
  25        101.409          11781.367            1.186            -0.000            -0.000            13.454
  50         54.484           6339.211            0.640            -0.000            -0.000             7.279
  76         43.922           4624.785            0.572            -0.000            -0.000             5.719
 101         36.199           3766.305            0.408            -0.000            -0.000             4.688
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DATE:   5/18/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA *******************************************************************************************

     CAL ID NUMBER:   86    ENGINE TYPE AND MODEL:  GTCP30-92               SERIAL NUMBER:    P-28794

                            RATED SHAFT HORSEPOWER:    40.

     ENGINE TOTAL TIME:                                0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      0. HRS
          N2 COMPRESSOR OVERHAUL:                      0. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
          N1 TURBINE OVERHAUL:                         0. HRS
          N2 TURBINE OVERHAUL:                         0. HRS

     FUEL: AV KEROS             FUEL H/C RATIO:   1.928

OPERATIONAL DATA **************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   93.00   FINISH   93.00

     ATMOSPHERIC PRESSURE:              START   28.84   FINISH   28.84

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0020

     RELATIVE HUMIDITY:                  15.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:    0.0 ,  FLOW RATE, LITERS/MIN:    0.0

     SAMPLE LINE TRANSPORT TIME, SEC:    0.0

 NUMBER OF TESTS:   5

 COMMENTS:

  COMBINATION SHP/BLEED LOADING



    TEST             POWER                  ENGINE              CORRECTED   GAS GEN       F/A      COMPRESSOR    COMPRESSOR    BLEED
    MODE       SHAFT           AIR          SPEED                 FUEL      AIR FLOW     CALC        INLET       DISCHARGE     FLOW
                 HP            HP            RPM                  FLOW      LB/SEC       FROM        TEMP        PRESSURE      LB/MIN
                                         N1            N2        LB/HR                 EMISSIONS   DEGREES F       PSIA

   22/ 0      40.30         19.65   58600.00     -0.00         68.00      -0.00      0.015700       89.00         38.30       20.07
   19/22      30.30         22.92   58600.00     -0.00         68.00      -0.00      0.015900       91.00         37.40       24.00
   15/19      20.20         25.56   58600.00     -0.00         67.00      -0.00      0.017100       95.00         36.50       27.39
   10/15      10.10         28.14   58600.00     -0.00         67.00      -0.00      0.017700       96.00         35.70       30.95
    5/10       0.0          29.15   59600.00     -0.00         66.00      -0.00      0.017900       95.00         35.10       32.82


  POWER    EXHAUST      EXHAUST          CO          CO         THC       NO        NO         NO      ALDEHYDES    SMOKE    PARTICULATES
 PERCENT    GAS          GAS           (WET)          2        (WET)     (WET)       2          X
  RATED     TEMP       PRESSURE        PPMV        (WET)       PPMV      PPMV      (WET)      (WET)
   SHP    DEGREES F      PSIA                    PERCENT V                         PPMV       PPMV

   100     1315.00      -0.00         341.20       3.17        3.10     28.90      9.90      38.80     -0.00      -0.00       -0.00
    75     1320.00      -0.00         345.40       3.21        2.60     29.50      9.20      38.70     -0.00      -0.00       -0.00
    50     1320.00      -0.00         342.30       3.44        1.80     31.60      8.90      40.50     -0.00      -0.00       -0.00
    25     1335.00      -0.00         346.80       3.56        1.50     34.50      9.30      43.70     -0.00      -0.00       -0.00
     0     1330.00      -0.00         341.10       3.60        1.00     35.30      9.40      44.70     -0.00      -0.00       -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   100      20.70      0.11     -0.00    3020.00     -0.00      3.87      1.41      0.01     -0.00    205.36     -0.00      0.26
    75      20.67      0.09     -0.00    3020.00     -0.00      3.08      1.41      0.01     -0.00    205.36     -0.00      0.21
    50      19.09      0.06     -0.00    3010.00     -0.00      3.71      1.29      0.00     -0.00    201.67     -0.00      0.25
    25      18.65      0.05     -0.00    3010.00     -0.00      3.86      1.25      0.00     -0.00    201.67     -0.00      0.26
     0      18.15      0.03     -0.00    3010.00     -0.00      3.90      1.20      0.00     -0.00    198.66     -0.00      0.26


  POWER          CO                 CO               THC               NO                 NO                NO
 PERCENT                             2                                                     2                 X
  RATED     LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR
   SHP

   100         23.477            3425.472            0.121            -0.000             -0.000             4.388
    75         26.418            3858.880            0.112            -0.000             -0.000             3.936
    50         27.944            4406.688            0.085            -0.000             -0.000             5.429
    25         32.681            5273.629            0.081            -0.000             -0.000             6.772
     0         41.092            6816.168            0.070            -0.000             -0.000             8.844
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DATE:   5/14/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:   36    ENGINE TYPE AND MODEL:  GTCP36-6                    SERIAL NUMBER:    P-34696

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                    0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          0. HRS
          N2 COMPRESSOR OVERHAUL:                          0. HRS
          COMBUSTOR CAN REPLACEMENT:                       0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
          N1 TURBINE OVERHAUL:                             0. HRS
          N2 TURBINE OVERHAUL:                             0. HRS

     FUEL: JP-5                    FUEL H/C RATIO:   1.877

OPERATIONAL DATA ********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   98.00   FINISH   98.00

     ATMOSPHERIC PRESSURE:              START   28.65   FINISH   28.65

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0050

     RELATIVE HUMIDITY:                      14.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   3

COMMENTS:

 SHP LOADING ONLY



     TEST             POWER                    ENGINE               CORRECTED   GAS GEN     F/A         COMPRESSOR    COMPRESSOR    BLEED
     MODE       SHAFT            AIR           SPEED                FUEL       AIR FLOW    CALC          INLET       DISCHARGE     FLOW
                 HP              HP            RPM                  FLOW       LB/SEC      FROM          TEMP        PRESSURE      LB/MIN
                                         N1             N2          LB/HR                  EMISSIONS   DEGREES F       PSIA

     1/ 0        0.0             0.0     59200.00      -0.00        64.50       -0.00     0.007400       98.00         53.00        0.0
     6/ 1       41.00            0.0     59100.00      -0.00        68.30       -0.00     0.009600       98.00         53.20        0.0
    11/ 6       53.70            0.0     59000.00      -0.00        94.10       -0.00     0.010400       98.00         53.20        0.0


   POWER    EXHAUST      EXHAUST           CO          CO        THC        NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
  PERCENT     GAS          GAS            (WET)         2       (WET)      (WET)        2           X
   RATED     TEMP        PRESSURE         PPMV       (WET)      PPMV       PPMV       (WET)       (WET)
   SHP     DEGREES F       PSIA                     PERCENT V                         PPMV        PPMV

     0      600.00        -0.00          145.60        1.52     14.20      11.30       6.80       18.10      -0.00       -0.00       -0.00
    25      715.00        -0.00          206.50        1.96     15.20      18.90      10.30       29.20      -0.00       -0.00       -0.00
    33      750.00        -0.00          218.80        2.12     14.60      20.20      12.10       32.30      -0.00       -0.00       -0.00


   POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
   RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

     0       18.79      1.05     -0.00    3090.00    -0.00      3.84      1.21      0.07     -0.00    199.30     -0.00      0.25
    25       20.56      0.86     -0.00    3070.00    -0.00      4.77      1.40      0.06     -0.00    209.68     -0.00      0.33
    33       20.15      0.77     -0.00    3070.00    -0.00      4.89      1.90      0.07     -0.00    288.89     -0.00      0.46


   POWER          CO                CO                THC               NO                NO                NO
  PERCENT                            2                                                     2                 X
   RATED     LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
   SHP

 *****HORSEPOWER-HR BASIS NOT CALCULABLE*****
    25          34.250          5114.164            1.438            -0.000            -0.000             7.954
    33          35.311          5379.641            1.348            -0.000            -0.000             8.565
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DATE:   5/14/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ************************************************************************************************************

      CAL ID NUMBER:   81    ENGINE TYPE AND MODEL:  GTCP36-6                  SERIAL NUMBER:    P-34696

                             RATED SHAFT HORSEPOWER:   160.

      ENGINE TOTAL TIME:                                 0. HRS

      TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

      TIME SINCE:

            N1 COMPRESSOR OVERHAUL:                      0. HRS
            N2 COMPRESSOR OVERHAUL:                      0. HRS
            COMBUSTOR CAN REPLACEMENT:                   0. HRS
            FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
            N1 TURBINE OVERHAUL:                         0. HRS
            N2 TURBINE OVERHAUL:                         0. HRS

      FUEL: JP-5                   FUEL H/C RATIO:   1.877

OPERATIONAL DATA *******************************************************************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START  101.00   FINISH  101.00

      ATMOSPHERIC PRESSURE:              START   28.65   FINISH   28.65

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0050

      RELATIVE HUMIDITY:                     14.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

      SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   3

COMMENTS:

 COMBINATION SHP/BLEED LOADING



     TEST              POWER                 ENGINE            CORRECTED   GAS GEN      F/A        COMPRESSOR        COMPRESSOR       BLEED
     MODE       SHAFT          AIR            SPEED              FUEL      AIR FLOW     CALC         INLET           DISCHARGE       FLOW
                 HP            HP              RPM               FLOW      LB/SEC       FROM         TEMP            PRESSURE        LB/MIN
                                         N1           N2         LB/HR               EMISSIONS    DEGREES F            PSIA

    15/ 0       91.10         56.38   58400.00      -0.00       149.40       -0.00    0.018700      100.00            50.10          42.35
    10/15       40.60         73.93   58600.00      -0.00       137.00       -0.00    0.017600      101.00            47.00          59.04
     5/10        0.0          96.41   59900.00      -0.00       123.90       -0.00    0.018000      102.00            44.30          81.70


  POWER    EXHAUST      EXHAUST          CO         CO         THC        NO          NO          NO      ALDEHYDES     SMOKE     PARTICULATES
 PERCENT     GAS          GAS           (WET)        2        (WET)      (WET)         2           X
  RATED     TEMP       PRESSURE         PPMV       (WET)       PPMV       PPMV       (WET)       (WET)
  SHP     DEGREES F      PSIA                    PERCENT V                            PPMV        PPMV

   56      1200.00       -0.00         243.30       3.79       3.90      47.50       12.20       59.70      -0.00        -0.00          -0.00
   25      1195.00       -0.00         291.90       3.58       7.20      40.90       13.40       54.30      -0.00        -0.00          -0.00
    0      1175.00       -0.00         259.00       3.65       9.00      41.30       12.60       53.90      -0.00        -0.00          -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HP     LB/HR
  SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   56       12.38      0.11     -0.00   3030.00     -0.00      4.98      1.85      0.02     -0.00    452.68     -0.00      0.74
   25       15.72      0.22     -0.00   3030.00     -0.00      4.81      2.15      0.03     -0.00    415.11     -0.00      0.66
    0       13.68      0.27     -0.00   3030.00     -0.00      4.69      1.70      0.03     -0.00    375.42     -0.00      0.58


  POWER          CO                 CO                  THC                 NO                  NO                 NO
 PERCENT                             2                                                           2                  X
  RATED     LB/1K HP-HR        LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR        LB/1K HP-HR
  SHP

   56          12.540           3069.376              0.115              -0.000              -0.000             5.050
   25          18.810           3624.527              0.266              -0.000              -0.000             5.749
    0          17.588           3894.060              0.349              -0.000              -0.000             6.013
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DATE:   5/14/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************

     CAL ID NUMBER:   37    ENGINE TYPE AND MODEL:  GTCP36-6                     SERIAL NUMBER:    P-34772

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                 0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       0. HRS
          N2 COMPRESSOR OVERHAUL:                       0. HRS
          COMBUSTOR CAN REPLACEMENT:                    0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                          0. HRS
          N2 TURBINE OVERHAUL:                          0. HRS

     FUEL: JP-5                  FUEL H/C RATIO:   1.877

OPERATIONAL DATA ***********************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   87.00   FINISH   87.00

     ATMOSPHERIC PRESSURE:              START   28.70   FINISH   28.70

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0048

     RELATIVE HUMIDITY:                   17.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY



   TEST            POWER                    ENGINE             CORRECTED   GAS GEN     F/A       COMPRESSOR      COMPRESSOR    BLEED
   MODE     SHAFT            AIR             SPEED                FUEL     AIR FLOW    CALC        INLET          DISCHARGE     FLOW
              HP              HP              RPM                 FLOW     LB/SEC      FROM        TEMP           PRESSURE      LB/MIN
                                       N1             N2          LB/HR               EMISSIONS  DEGREES F          PSIA

   1/ 0      0.0             0.0    29100.00       -0.00         72.60      -0.00    0.008000      84.00           52.90         0.0
   6/ 1     39.50            0.0    58900.00       -0.00         90.60      -0.00    0.010100      86.00           53.40         0.0
  11/ 6     78.70            0.0    58600.00       -0.00        109.60      -0.00    0.012200      88.00           54.40         0.0
  16/11    114.00            0.0    58500.00       -0.00        128.70      -0.00    0.014300      89.00           54.40         0.0
  20/16    118.70            0.0    28300.00       -0.00        132.90      -0.00    0.015000      90.00           54.10         0.0


 POWER    EXHAUST      EXHAUST           CO         CO          THC       NO         NO          NO     ALDEHYDES   SMOKE    PARTICULATES
 PERCENT    GAS          GAS            (WET)         2        (WET)     (WET)        2           X
 RATED     TEMP        PRESSURE         PPMV       (WET)       PPMV      PPMV      (WET)       (WET)
 SHP     DEGREES F       PSIA                    PERCENT V                          PPMV        PPMV

   0      540.00        -0.00          114.10       1.63        3.50     16.00      5.20        21.30    -0.00      -0.00       -0.00
  24      635.00        -0.00          130.10       2.06        1.80     21.10      8.10        29.20    -0.00      -0.00       -0.00
  49      740.00        -0.00          130.70       2.50        1.40     27.40      9.70        37.10    -0.00      -0.00       -0.00
  71      860.00        -0.00          122.80       2.93        0.50     37.60      9.20        46.80    -0.00      -0.00       -0.00
  74      905.00        -0.00          120.20       3.07        0.30     41.40      8.70        50.00    -0.00      -0.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0       13.75      0.24     -0.00    3090.00    -0.00      4.21      1.00      0.02     -0.00     224.33    -0.00      0.31
  24       12.38      0.10     -0.00    3080.00    -0.00      4.56      1.12      0.01     -0.00     279.05    -0.00      0.41
  49       10.21      0.06     -0.00    3070.00    -0.00      4.76      1.12      0.01     -0.00     336.47    -0.00      0.52
  71        8.17      0.02     -0.00    3060.00    -0.00      5.12      1.05      0.00     -0.00     393.82    -0.00      0.66
  74        7.62      0.01     -0.00    3060.00    -0.00      5.21      1.01      0.00     -0.00     406.67    -0.00      0.69


 POWER          CO                CO                THC              NO              NO             NO
 PERCENT                            2                                                  2               X
 RATED     LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR
 SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
  24         28.389           7064.496            0.225           -0.000           -0.000          10.464
  49         14.222           4275.371            0.089           -0.000           -0.000           6.630
  71          9.226           3454.578            0.024           -0.000           -0.000           5.777
  74          8.528           3426.063            0.011           -0.000           -0.000           5.832
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DATE:   5/14/71

TEST ORGANIZATION:   AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA **************************************************************************************************

      CAL ID NUMBER:   82    ENGINE TYPE AND MODEL:  GTCP36-6             SERIAL NUMBER:     P-34772

                              RATED SHAFT HORSEPOWER:   160.

      ENGINE TOTAL TIME:                                0. HRS

      TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

      TIME SINCE:

           N1 COMPRESSOR OVERHAUL:                      0. HRS
           N2 COMPRESSOR OVERHAUL:                      0. HRS
           COMBUSTOR CAN REPLACEMENT:                   0. HRS
           FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
           N1 TURBINE OVERHAUL:                         0. HRS
           N2 TURBINE OVERHAUL:                         0. HRS

      FUEL: JP-5                FUEL H/C RATIO:   1.877

OPERATIONAL DATA *********************************************************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START    93.00    FINISH    93.00

      ATMOSPHERIC PRESSURE:              START    28.70    FINISH    28.70

      INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0048

      RELATIVE HUMIDITY:                    17.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

      SAMPLE LINE TRANSPORT TIME, SEC:    -0.00

NUMBER OF TESTS:   3

COMMENTS:

 COMBINATION SHP/BLEED LOADING



     TEST           POWER                ENGINE             CORRECTED    GAS GEN      F/A      COMPRESSOR      COMPRESSOR     BLEED
     MODE     SHAFT          AIR          SPEED               FUEL       AIR FLOW     CALC       INLET         DISCHARGE      FLOW
               HP            HP            RPM                FLOW       LB/SEC       FROM       TEMP          PRESSURE       LB/MIN
                                    N1              N2        LB/HR                 EMISSIONS  DEGREES F         PSIA

     15/ 0    78.20         64.63  58200.00       -0.00      139.80       -0.00    0.018700      93.00          50.10         49.16
     10/15    39.10         80.39  58300.00       -0.00      132.90       -0.00    0.017000      94.00          47.30         64.60
      5/10     0.0          86.25  58500.00       -0.00      122.70       -0.00    0.017600      93.00          44.30         74.28


   POWER     EXHAUST      EXHAUST          CO          CO         THC        NO         NO         NO     ALDEHYDES    SMOKE    PARTICULATES
   PERCENT     GAS          GAS           (WET)         2        (WET)      (WET)        2          X
   RATED       TEMP       PRESSURE        PPMV        (WET)       PPMV       PPMV      (WET)      (WET)
   SHP      DEGREES F       PSIA                    PERCENT V                          PPMV       PPMV

     48      1145.00       -0.00         116.90        3.80       0.40      47.40       7.30      54.70    -0.00       -0.00        -0.00
     24      1155.00       -0.00         100.00        3.47       0.60      54.70       6.90      61.50    -0.00       -0.00        -0.00
      0      1155.00       -0.00         106.90        3.55       0.50      50.50       6.30      56.80    -0.00       -0.00        -0.00


   POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
   PERCENT     CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
   RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

     48       5.95      0.01     -0.00   3040.00     -0.00      4.57      0.83      0.00     -0.00    424.99     -0.00      0.64
     24       5.59      0.02     -0.00   3050.00     -0.00      5.66      0.74      0.00     -0.00    405.34     -0.00      0.75
      0       5.78      0.01     -0.00   3050.00     -0.00      5.04      0.71      0.00     -0.00    374.23     -0.00      0.62


   POWER          CO                 CO                  THC                 NO                  NO                 NO
   PERCENT                            2                                                           2                  X
   RATED     LB/1K HP-HR        LB/1K HP-HR          LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR        LB/1K HP-HR
   SHP

     48         5.820            2975.469               0.010              -0.000              -0.000              4.477
     24         6.223            3392.153               0.020              -0.000              -0.000              6.291
      0         8.220            4339.047               0.021              -0.000              -0.000              7.169
```

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DATE:   5/26/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:   38    ENGINE TYPE AND MODEL:  GTCP660-4                SERIAL NUMBER:     P-37596

                            RATED SHAFT HORSEPOWER:    300.

     ENGINE TOTAL TIME:                                     0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                       0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                           0. HRS
          N2 COMPRESSOR OVERHAUL:                           0. HRS
          COMBUSTOR CAN REPLACEMENT:                        0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:           0. HRS
          N1 TURBINE OVERHAUL:                              0. HRS
          N2 TURBINE OVERHAUL:                              0. HRS

     FUEL: JP-5                  FUEL H/C RATIO:   1.877

OPERATIONAL DATA *******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   88.00   FINISH   88.00

     ATMOSPHERIC PRESSURE:              START   28.69   FINISH   28.69

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0037

     RELATIVE HUMIDITY:                      15.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP ONLY, SURGE VALVE OPEN



     TEST          POWER                 ENGINE           CORRECTED  GAS GEN    F/A        COMPRESSOR    COMPRESSOR    BLEED
     MODE      SHAFT        AIR           SPEED              FUEL    AIR FLOW   CALC         INLET       DISCHARGE     FLOW
                HP          HP             RPM               FLOW    LB/SEC     FROM         TEMP        PRESSURE      LB/MIN
                                      N1          N2        LB/HR               EMISSIONS    DEGREES F     PSIA

     1/ 0      -3.0         0.0    20020.00      -0.00     596.00    -0.00     0.008000      86.00        55.10         0.0
     6/ 1      74.90        0.0    20010.00      -0.00     641.50    -0.00     0.008400      87.00        55.70         0.0
    11/ 6     150.10        0.0    20010.00      -0.00     686.00    -0.00     0.009300      88.00        56.20         0.0
    16/11     224.90        0.0    20020.00      -0.00     725.00    -0.00     0.009700      88.00        56.80         0.0
    20/16     302.30        0.0    20010.00      -0.00     773.00    -0.00     0.010500      89.00        57.10         0.0


   POWER    EXHAUST     EXHAUST        CO         CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
  PERCENT     GAS         GAS         (WET)        2       (WET)     (WET)       2         X
   RATED     TEMP       PRESSURE      PPMV       (WET)      PPMV      PPMV     (WET)     (WET)
   SHP     DEGREES F      PSIA                PERCENT V                        PPMV      PPMV

     0      681.00       -0.00       116.70      1.63      11.20     18.40      5.20     23.50     -0.00      -0.00       -0.00
    24      723.00       -0.00       114.00      1.72       9.60     20.60      5.40     26.00     -0.00      -0.00       -0.00
    50      763.00       -0.00       117.20      1.90       9.40     22.30      5.90     28.20     -0.00      -0.00       -0.00
    74      801.00       -0.00       112.50      1.98       8.50     24.60      5.80     30.40     -0.00      -0.00       -0.00
   100      849.00       -0.00       117.80      2.16       9.30     27.20      6.10     33.40     -0.00      -0.00       -0.00


   POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
   RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

     0      14.08      0.77     -0.00    3090.00    -0.00      4.67      8.39      0.46     -0.00    1841.64    -0.00      2.78
    24      13.04      0.63     -0.00    3090.00    -0.00      4.89      8.36      0.40     -0.00    1982.23    -0.00      3.13
    50      12.12      0.56     -0.00    3090.00    -0.00      4.78      8.31      0.38     -0.00    2119.74    -0.00      3.28
    74      11.17      0.48     -0.00    3090.00    -0.00      4.95      8.10      0.35     -0.00    2240.25    -0.00      3.59
   100      10.72      0.48     -0.00    3080.00    -0.00      4.99      8.29      0.37     -0.00    2380.84    -0.00      3.85


   POWER          CO                CO                THC               NO                NO                NO
  PERCENT                            2                                                     2                 X
   RATED     LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
   SHP

*****HORSFPOWER-HR BASIS NOT CALCULABLE*****
    24         111.650         26465.082           5.353            -0.000            -0.000            41.847
    50          55.374         14122.184           2.546            -0.000            -0.000            21.860
    74          36.002          9961.090           1.563            -0.000            -0.000            15.970
   100          27.407          7875.758           1.230            -0.000            -0.000            12.750
```

DATE: 5/26/71

TEST ORGANIZATION: AIRESEARCH

ENGINE SUPPLIER: AIRESEARCH

ENGINE DATA **

CAL ID NUMBER: 83 ENGINE TYPE AND MODEL: GTCP660-4 SERIAL NUMBER: P-37596

RATED SHAFT HORSEPOWER: 300.

ENGINE TOTAL TIME: 0. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 0. HRS
N2 COMPRESSOR OVERHAUL: 0. HRS
COMBUSTOR CAN REPLACEMENT: 0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 0. HRS
N1 TURBINE OVERHAUL: 0. HRS
N2 TURBINE OVERHAUL: 0. HRS

FUEL: JP-5 FUEL H/C RATIO: 1.877

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 91.00 FINISH 91.00

ATMOSPHERIC PRESSURE: START 28.69 FINISH 28.69

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0037

RELATIVE HUMIDITY: 15.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: -0.00

SAMPLE LINE TRANSPORT TIME, SEC: -0.00

NUMBER OF TESTS: 6

COMMENTS:

COMBINATION SHP/BLEED LOADING

TEST MODE	POWER SHAFT HP	POWER AIR HP	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	CORRECTED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	F/A CALC FROM EMISSIONS	COMPRESSOR INLET TEMP DEGREES F	COMPRESSOR DISCHARGE PRESSURE PSIA	BLEED FLOW LB/MIN
22/ 0	302.40	630.10	20020.00	-0.00	970.00	-0.00	0.016900	89.00	51.70	468.46
19/22	227.30	637.51	20010.00	-0.00	442.00	-0.00	0.016400	90.00	50.50	483.82
15/19	150.10	651.35	20010.00	-0.00	914.00	-0.00	0.016200	90.00	49.40	504.98
10/15	74.90	659.68	20010.00	-0.00	885.00	-0.00	0.016400	92.00	48.00	524.23
5/10	0.0	665.27	20020.00	-0.00	872.00	-0.00	0.015900	92.00	46.90	541.12
3/ 5	0.0	564.58	20010.00	-0.00	757.00	-0.00	0.012700	95.00	49.60	432.06

POWER PERCENT RATED SHP	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
100	1209.00	-0.00	146.60	3.45	9.00	49.30	8.80	58.10	-0.00	-0.00	-0.00
75	1202.00	-0.00	146.70	3.34	12.30	48.70	8.20	56.80	-0.00	-0.00	-0.00
50	1194.00	-0.00	143.50	3.30	10.00	46.50	8.50	55.00	-0.00	-0.00	-0.00
24	1187.00	-0.00	154.10	3.34	13.00	47.60	7.90	55.50	-0.00	-0.00	-0.00
0	1180.00	-0.00	156.80	3.25	11.80	45.10	8.50	53.60	-0.00	-0.00	-0.00
0	953.00	-0.00	129.40	2.59	13.40	34.30	6.90	41.30	-0.00	-0.00	-0.00

POWER PERCENT RATED SHP	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
100	8.24	0.29	-0.00	3050.00	-0.00	5.36	8.00	0.28	-0.00	2958.59	-0.00	5.20
75	8.53	0.41	-0.00	3050.00	-0.00	5.43	3.77	0.18	-0.00	1348.13	-0.00	2.40
50	8.43	0.34	-0.00	3050.00	-0.00	5.31	7.70	0.31	-0.00	2787.70	-0.00	4.95
24	8.96	0.43	-0.00	3050.00	-0.00	5.30	7.93	0.38	-0.00	2699.25	-0.00	4.69
0	9.38	0.40	-0.00	3050.00	-0.00	5.26	8.17	0.35	-0.00	2659.60	-0.00	4.59
0	9.76	0.58	-0.00	3070.00	-0.00	5.11	7.39	0.44	-0.00	2321.99	-0.00	3.87

POWER PERCENT RATED SHP	CO LB/1K HP-HR	CO_2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO_2 LB/1K HP-HR	NO_x LB/1K HP-HR
100	8.576	3172.655	0.301	-0.000	-0.000	5.579
75	4.360	1559.845	0.208	-0.000	-0.000	2.773
50	9.609	3478.325	0.383	-0.000	-0.000	6.057
24	10.794	3674.553	0.522	-0.000	-0.000	6.331
0	12.268	3997.783	0.530	-0.000	-0.000	6.900
0	13.093	4116.340	0.774	-0.000	-0.000	6.859

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DATE:   5/25/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ********************************************************************************************************

     CAC ID NUMBER:   39   ENGINE TYPE AND MODEL:  GTCP660-4               SERIAL NUMBER:    P-37705

                           RATED SHAFT HORSEPOWER:   300.

     ENGINE TOTAL TIME:                              0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                    C. HRS
          N2 COMPRESSOR OVERHAUL:                    0. HRS
          COMBUSTOR CAN REPLACEMENT:                 0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    0. HRS
          N1 TURBINE OVERHAUL:                       0. HRS
          N2 TURBINE OVERHAUL:                       0. HRS

     FUEL: JP-5              FUEL H/C RATIO:   1.877

OPERATIONAL DATA ***************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   96.00   FINISH   96.00

     ATMOSPHERIC PRESSURE:              START   28.58   FINISH   28.58

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0031

     RELATIVE HUMIDITY:                    9.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP ONLY, SURGE VALVE OPEN



     TEST            POWER                  ENGINE              CORRECTED   GAS GEN     F/A        COMPRESSOR     COMPRESSOR    BLEED
     MODE      SHAFT          AIR           SPEED                 FUEL      AIR FLOW    CALC         INLET        DISCHARGE     FLOW
                HP            HP             RPM                  FLOW      LB/SEC      FROM         TEMP         PRESSURE      LB/MIN
                                        N1           N2           LB/HR                 EMISSIONS   DEGREES F       PSIA

     1/ 0       0.0           0.0    20010.00      -0.00        596.00      -0.00     0.007700      96.00          54.10        0.0
     6/ 1      74.90          0.0    20010.00      -0.00        636.50      -0.00     0.008200      96.00          54.70        0.0
    11/ 6     151.10          0.0.   20000.00      -0.00        685.00      -0.00     0.009000      96.00          55.30        0.0
    16/11     225.90          0.0     2000.00      -0.00        723.00      -0.00     0.009600      97.00          56.00        0.0
    20/16     302.30          0.0    20010.00      -0.00        757.00      -0.00     0.010100      96.00          56.60        0.0


   POWER    EXHAUST      EXHAUST         CO          CO        THC       NO        NO        NO     ALDEHYDES   SHOKE    PARTICULATES
  PERCENT     GAS          GAS          (WET)          2       (WET)     (WET)       2         X
   RATED      TEMP       PRESSURE       PPMV        (WET)      PPMV      PPMV      (WET)     (WET)
    SHP    DEGREES F       PSIA                   PERCENT V                        PPMV      PPMV

     0       681.00       -0.00         77.10        1.58      21.30     17.00      3.80     20.80    -0.00      -0.00       -0.00
    24       719.00       -0.00         80.40        1.68      10.60     20.50      4.80     25.20    -0.00      -0.00       -0.00
    50       767.00       -0.00         87.40        1.85      28.50     23.10      5.20     28.30    -0.00      -0.00       -0.00
    75       800.00       -0.00         92.80        1.96       8.40     25.20      5.90     31.10    -0.00      -0.00       -0.00
   100       823.00       -0.00        103.80        2.06      19.00     27.40      6.30     33.70    -0.00      -0.00       -0.00


   POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
   RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
    SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

     0        9.61      1.52     -0.00   3100.00     -0.00      4.26      5.73      0.90     -0.00   1847.60     -0.00      2.54
    24        9.41      0.71     -0.00   3100.00     -0.00      4.85      5.99      0.45     -0.00   1973.15     -0.00      3.09
    50        9.28      1.73     -0.00   3090.00     -0.00      4.93      6.36      1.18     -0.00   2116.65     -0.00      3.38
    75        9.30      0.48     -0.00   3090.00     -0.00      5.12      6.73      0.35     -0.00   2234.07     -0.00      3.70
   100        9.87      1.03     -0.00   3080.00     -0.00      5.27      7.47      0.78     -0.00   2331.56     -0.00      3.99


   POWER         CO                 CO               THC                NO                NO                NO
  PERCENT                             2                                                     2                 X
   RATED     LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
    SHP

  *****HORSEPOWER-HR BASIS NOT CALCULABLE*****
    24         80.009          26343.789           6.008            -0.000            -0.000            41.258
    50         42.070          14008.266           7.838            -0.000            -0.000            22.363
    75         29.771           9889.637           1.549            -0.000            -0.000            16.390
   100         24.723           7712.738           2.579            -0.000            -0.000            13.192
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DATE:   5/25/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:   84    ENGINE TYPE AND MODEL:  GTCP660-4                  SERIAL NUMBER:    P-37705

                            RATED SHAFT HORSEPOWER:   300.

     ENGINE TOTAL TIME:                                 0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       0. HRS
          N2 COMPRESSOR OVERHAUL:                       0. HRS
          COMBUSTOR CAN REPLACEMENT:                    0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                          0. HRS
          N2 TURBINE OVERHAUL:                          0. HRS

     FUEL:  JP-5              FUEL H/C RATIO:   1.877

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    98.00    FINISH    98.00

     ATMOSPHERIC PRESSURE:              START    28.58    FINISH    28.58

     INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0031

     RELATIVE HUMIDITY:                     9.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:    -0.00,  FLOW RATE, LITERS/MIN:    -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 COMBINATION SHP/BLEED LOADING



    TEST              POWER                  ENGINE              CORRECTED   GAS GEN      F/A        COMPRESSOR       COMPRESSOR     BLEED
    MODE        SHAFT          AIR           SPEED                 FUEL      AIR FLOW     CALC         INLET          DISCHARGE      FLOW
                  HP            HP            RPM                  FLOW      LB/SEC       FROM          TEMP           PRESSURE      LB/MIN
                                         N1          N2           LB/HR                 EMISSIONS    DEGREES F          PSIA

    22/ 0     302.10        669.65   20000.00      -0.00         962.00      -0.00     0.015900        98.00           51.00        496.22
    19/22     225.90        676.99   20000.00      -0.00         932.00      -0.00     0.016200        97.00           49.90        513.21
    15/19     149.80        685.29   20000.00      -0.00         907.00      -0.00     0.016300        98.00           48.70        531.06
    10/15      74.90        698.22    2000.00      -0.00         885.00      -0.00     0.016700       100.00           47.30        555.03
     5/10       0.0         698.09   20000.00      -0.00         857.00      -0.00     0.016400        99.00           46.00        571.89


   POWER    EXHAUST     EXHAUST          CO         CO        THC       NO        NO        NO     ALDEHYDES   SMOKE    PARTICULATES
  PERCENT     GAS         GAS          (WET)         2       (WET)     (WET)       2         X
   RATED     TEMP       PRESSURE        PPMV       (WET)      PPMV      PPMV     (WET)     (WET)
    SHP    DEGREES F      PSIA                   PERCENT V                       PPMV      PPMV

    100     1202.00      -0.00         167.50      3.23     13.90     51.00      9.30     60.30    -0.00      -0.00       -0.00
     75     1192.00      -0.00         174.20      3.30     26.70     50.40      9.90     60.20    -0.00      -0.00       -0.00
     49     1183.00      -0.00         177.10      3.32     15.00     53.90     10.90     64.80    -0.00      -0.00       -0.00
     24     1172.00      -0.00         191.40      3.39     28.40     56.80     11.00     67.80    -0.00      -0.00       -0.00
      0     1162.00      -0.00         197.30      3.34     23.90     54.60     11.40     66.00    -0.00      -0.00       -0.00


   POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
   RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
    SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    100      10.05      0.48     -0.00   3050.00     -0.00      5.94      9.67      0.46     -0.00   2934.10     -0.00      5.72
     75      10.24      0.90     -0.00   3050.00     -0.00      5.81      9.54      0.84     -0.00   2842.60     -0.00      5.42
     49      10.34      0.50     -0.00   3050.00     -0.00      6.22      9.38      0.45     -0.00   2766.35     -0.00      5.64
     24      10.93      0.93     -0.00   3040.00     -0.00      6.36      9.68      0.82     -0.00   2690.40     -0.00      5.63
      0      11.45      0.79     -0.00   3040.00     -0.00      6.29      9.81      0.68     -0.00   2605.28     -0.00      5.39


   POWER          CO                 CO                THC                NO                 NO                 NO
  PERCENT                             2                                                       2                  X
   RATED     LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR
    SHP

    100           9.952          3019.409              0.471            -0.000             -0.000              5.884
     75          10.569          3148.351              0.927            -0.000             -0.000              6.003
     49          11.236          3312.624              0.544            -0.000             -0.000              6.756
     24          12.517          3479.941              1.061            -0.000             -0.000              7.285
      0          14.054          3732.031              0.972            -0.000             -0.000              7.729
```

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DATE:   5/25/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:   40    ENGINE TYPE AND MODEL:  TSCP700-4              SERIAL NUMBER:    P-90122

                            RATED SHAFT HORSEPOWER:   142.

     ENGINE TOTAL TIME:                                0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      0. HRS
          N2 COMPRESSOR OVERHAUL:                      0. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
          N1 TURBINE OVERHAUL:                         0. HRS
          N2 TURBINE OVERHAUL:                         0. HRS

     FUEL: JP-5                 FUEL H/C RATIO:   1.877

OPERATIONAL DATA **********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   93.00   FINISH   93.00

     ATMOSPHERIC PRESSURE:              START   28.66   FINISH   28.66

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0037

     RELATIVE HUMIDITY:                      18.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   6

COMMENTS:

 STANDBY MODE, SHP ONLY, SURGE VALVE OPEN



   TEST            POWER                 ENGINE            CORRECTED   GAS GEN      F/A        COMPRESSOR       COMPRESSOR      BLEED
   MODE      SHAFT          AIR           SPEED               FUEL     AIR FLOW     CALC          INLET          DISCHARGE      FLOW
              HP            HP             RPM                FLOW     LB/SEC       FROM          TEMP            PRESSURE      LB/MIN
                                      N1          N2         LB/HR                  EMISSIONS    DEGREES F           PSIA

   1/ 0       0.0           0.0    17680.00  35350.00       225.00      -0.00    0.011300         78.00            37.70        0.0
   2/ 1       0.0           0.0    24890.00  35950.00       337.00      -0.00    0.011300         89.00           101.00        0.0
   6/ 2      36.00          0.0    25000.00  35830.00       371.00      -0.00    0.011800         92.00           104.00        0.0
  11/ 6      70.70          0.0    25600.00  35800.00       394.00      -0.00    0.012200         99.00           106.90        0.0
  16/11     104.00          0.0    25900.00  35750.00       417.50      -0.00    0.012700        100.00           108.90        0.0
  20/16     141.00          0.0    26400.00  35690.00       442.00      -0.00    0.013500         98.00           110.80        0.0


 POWER     EXHAUST       EXHAUST          CO          CO         THC        NO         NO         NO     ALDEHYDES   SMOKE    PARTICULATES
PERCENT      GAS           GAS           (WET)         2        (WET)      (WET)        2          X
 RATED       TEMP        PRESSURE        PPMV       (WET)       PPMV       PPMV       (WET)      (WET)
 SHP      DEGREES F        PSIA                   PERCENT V                           PPMV       PPMV

   0        819.00        -0.00         251.70        2.28      160.00      22.50     12.90      35.40     -0.00      -0.00       -0.00
   0        777.00        -0.00          78.70        2.32       58.40      52.60     11.70      64.30     -0.00      -0.00       -0.00
  25        800.00        -0.00          55.80        2.41       63.80      53.60      8.40      62.00     -0.00      -0.00       -0.00
  49        833.00        -0.00          40.40        2.50       53.60      62.80      7.00      69.80     -0.00      -0.00       -0.00
  73        858.00        -0.00          30.50        2.60       61.60      71.20      6.20      77.40     -0.00      -0.00       -0.00
  99        893.00        -0.00          25.00        2.77       60.50      72.80     16.50      89.30     -0.00      -0.00       -0.00


 POWER     MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED      LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 SHP       LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0        21.33      7.75     -0.00    3040.00    -0.00      4.93      4.80      1.74     -0.00     684.00    -0.00      1.11
   0         6.64      2.82     -0.00    3080.00    -0.00      8.91      2.24      0.95     -0.00    1037.96    -0.00      3.00
  25         4.52      2.96     -0.00    3080.00    -0.00      8.26      1.68      1.10     -0.00    1142.68    -0.00      3.06
  49         3.17      2.40     -0.00    3080.00    -0.00      8.98      1.25      0.95     -0.00    1213.52    -0.00      3.54
  73         2.29      2.65     -0.00    3080.00    -0.00      9.56      0.96      1.11     -0.00    1285.90    -0.00      3.99
  99         1.76      2.44     -0.00    3070.00    -0.00     10.36      0.78      1.08     -0.00    1356.94    -0.00      4.58


 POWER          CO                 CO                THC                 NO                 NO                 NO
PERCENT                             2                                                        2                  X
 RATED     LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR
 SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
  25          46.602          31741.105            30.494             -0.000             -0.000             85.124
  49          17.644          17164.352            13.369             -0.000             -0.000             50.050
  73           9.201          12364.422            10.634             -0.000             -0.000             38.386
  99           5.530           9623.684             7.661             -0.000             -0.000             32.489
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DATE:   5/25/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ************************************************************************************************

      CAL ID NUMBER:   85    ENGINE TYPE AND MODEL:  TSCP700-4                SERIAL NUMBER:    P-90122

                             RATED SHAFT HORSEPOWER:   142.

      ENGINE TOTAL TIME:                                   0. HRS

      TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

      TIME SINCE:

            N1 COMPRESSOR OVERHAUL:                        0. HRS
            N2 COMPRESSOR OVERHAUL:                        0. HRS
            COMBUSTOR CAN REPLACEMENT:                     0. HRS
            FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
            N1 TURBINE OVERHAUL:                           0. HRS
            N2 TURBINE OVERHAUL:                           0. HRS

      FUEL: JP-5                 FUEL H/C RATIO:   1.877

OPERATIONAL DATA *******************************************************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START    88.00    FINISH    88.00

      ATMOSPHERIC PRESSURE:              START    28.66    FINISH    28.66

      INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0037

      RELATIVE HUMIDITY:                    18.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

      SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   6

COMMENTS:

 NORMAL MODE, COMBINATION LOAD




      TEST              POWER                 ENGINE             CORRECTED   GAS GEN      F/A       COMPRESSOR      COMPRESSOR     BLEED
      MODE       SHAFT          AIR            SPEED               FUEL      AIR FLOW     CALC        INLET          DISCHARGE     FLOW
                  HP            HP              RPM                FLOW      LB/SEC       FROM        TEMP           PRESSURE      LB/MIN
                                          N1         N2            LB/HR                EMISSIONS   DEGREES F          PSIA

     22/ 0      139.60 .     1171.89   27300.00   35350.00        495.50      -0.00     0.015200      90.00          111.30        480.26
     19/22      102.80       1191.55   27300.00   35350.00        487.00      -0.00     0.015200      89.00          109.40        494.73
     15/19       69.80       1198.68   27300.00   35350.00        477.00      -0.00     0.015200      87.00          108.50        502.22
     10/15       35.50       1203.58   27300.00   35350.00        469.00      -0.00     0.015300      86.00          106.90        510.16
      5/10        0.0        1197.28   27300.00   25250.00        467.00      -0.00     0.015500      85.00          104.50        516.13
     25/ 5        0.0        1033.62   28100.00   35350.00        467.00      -0.00     0.013000      93.00          125.10        391.08


   POWER    EXHAUST       EXHAUST           CO         CO        THC        NO         NO         NO      ALDEHYDES    SMOKE    PARTICULATES
  PERCENT     GAS           GAS           (WET)         2       (WET)     (WET)         2          X
   RATED      TEMP        PRESSURE         PPMV      (WET)       PPMV      PPMV      (WET)      (WET)
   SHP     DEGREES F        PSIA                    PERCENT V                        PPMV       PPMV

    98      1005.00        -0.00           23.80       3.11      65.50     97.50      3.80     101.30     -0.00      -0.00        -0.00
    72      1005.00        -0.00           20.40       3.10      75.30    109.30      4.40     113.70     -0.00      -0.00        -0.00
    49      1005.00        -0.00           20.40       3.10      69.60     90.80      3.50      94.30     -0.00      -0.00        -0.00
    25      1005.00        -0.00           22.70       3.12      81.50     95.70      4.00      99.70     -0.00      -0.00        -0.00
     0      1005.00        -0.00           22.60       3.13      62.30     92.10      3.50      95.50     -0.00      -0.00        -0.00
     0       887.00        -0.00           26.10       2.66      74.90     93.20      5.70      98.90     -0.00      -0.00        -0.00


   POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
   RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    98        1.49      2.35     -0.00   3060.00     -0.00     10.43      0.74      1.16     -0.00   1516.23     -0.00       5.17
    72        1.28      2.70     -0.00   3060.00     -0.00     11.72      0.62      1.32     -0.00   1490.22     -0.00       5.71
    49        1.28      2.50     -0.00   3060.00     -0.00      9.73      0.61      1.19     -0.00   1459.62     -0.00       4.64
    25        1.41      2.90     -0.00   3060.00     -0.00     10.22      0.66      1.36     -0.00   1435.14     -0.00       4.79
     0        1.39      2.18     -0.00   3090.00     -0.00      9.62      0.65      1.02     -0.00   1443.03     -0.00       4.49
     0        1.92      3.15     -0.00   3070.00     -0.00     11.96      0.90      1.47     -0.00   1433.69     -0.00       5.59


   POWER          CO                 CO                 THC                 NO                  NO                  NO
  PERCENT                             2                                                          2                   X
   RATED     LB/1K HP-HR       . LB/1K HP-HR       LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR
   SHP

    98          0.563             1156.111             0.887              -0.000              -0.000               3.942
    72          0.483             1151.326             1.017              -0.000              -0.000               4.411
    49          0.483             1150.686             0.939              -0.000              -0.000               3.658
    25          0.535             1158.231             1.100              -0.000              -0.000               3.867
     0          0.541             1205.256             0.852              -0.000              -0.000               3.752
     0          0.868             1387.052             1.424              -0.000              -0.000               5.404
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DATE:   5/27/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:   41    ENGINE TYPE AND MODEL:  TSCP700-4                  SERIAL NUMBER:    P-90123

                            RATED SHAFT HORSEPOWER:   142.

     ENGINE TOTAL TIME:                                   0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         0. HRS
          N2 COMPRESSOR OVERHAUL:                         0. HRS
          COMBUSTOR CAN REPLACEMENT:                      0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
          N1 TURBINE OVERHAUL:                            0. HRS
          N2 TURBINE OVERHAUL:                            0. HRS

     FUEL: JP-5                 FUEL H/C RATIO:   1.877

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   97.00   FINISH   97.00

     ATMOSPHERIC PRESSURE:              START   28.72   FINISH   28.72

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0041

     RELATIVE HUMIDITY:                    18.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   6

COMMENTS:

 STANDBY MODE, SHP ONLY, SURGE VALVE OPEN



     TEST            POWER                    ENGINE              CORRECTED   GAS GEN      F/A       COMPRESSOR      COMPRESSOR    BLEED
     MODE      SHAFT           AIR             SPEED                FUEL      AIR FLOW     CALC        INLET         DISCHARGE     FLOW
                HP             HP               RPM                 FLOW      LB/SEC       FROM        TEMP          PRESSURE      LB/MIN
                                          N1          N2            LB/HR                EMISSIONS   DEGREES F         PSIA

     1/ 0       0.0            0.0     17650.00  35440.00          228.00      -0.00     0.011600      82.00          59.10         0.0
     2/ 1       0.0            0.0     28100.00  35000.00          481.00      -0.00     0.014000     100.00         115.10         0.0
     6/ 2      34.80           0.0     27800.00  34650.00          482.00      -0.00     0.014600     103.00         114.00         0.0
    11/ 6      68.40           0.0     25550.00  34650.00          409.00      -0.00     0.012700      96.00         102.10         0.0
    16/11     103.90           0.0     26270.00  35730.00          436.00      -0.00     0.013300     102.00         106.10         0.0
    20/16     141.10           0.0     26750.00  35720.00          469.00      -0.00     0.014300     100.00         110.10         0.0


   POWER     EXHAUST      EXHAUST          CO          CO         THC        NO         NO        NO      ALDEHYDES     SMOKE     PARTICULATES
  PERCENT      GAS          GAS           (WET)         2        (WET)      (WET)        2         X
   RATED      TEMP       PRESSURE         PPMV       (WET)       PPMV       PPMV      (WET)     (WET)
   SHP     DEGREES F       PSIA                     PERCENT V                          PPMV      PPMV

     0       842.00       -0.00          193.20        2.35       69.50      20.80     12.60     33.40      -0.00       -0.00        -0.00
     0       939.00       -0.00           16.00        2.88       31.00      45.20      1.40     46.50      -0.00       -0.00        -0.00
    24       979.00       -0.00           18.80        2.99       55.60      46.50      2.10     48.60      -0.00       -0.00        -0.00
    48       884.00       -0.00           22.20        2.61       18.10      44.60      3.70     48.30      -0.00       -0.00        -0.00
    73       92[illegible].00       -0.00           18.90        2.73       40.90      52.10      2.80     54.90      -0.00       -0.00        -0.00
    99       95[illegible].00       -0.00           14.80        2.92       43.60      60.40      3.30     63.70      -0.00       -0.00        -0.00


   POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
   RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K    LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

     0       15.98      3.28     -0.00    3060.00    -0.00      4.54      3.64      0.75     -0.00     697.68    -0.00      1.04
     0        1.09      1.20     -0.00    3070.00    -0.00      5.20      0.52      0.58     -0.00    1476.67    -0.00      2.50
    24        1.23      2.07     -0.00    3070.00    -0.00      5.21      0.59      1.00     -0.00    1479.74    -0.00      2.51
    48        1.67      0.78     -0.00    3080.00    -0.00      5.96      0.68      0.32     -0.00    1259.72    -0.00      2.44
    73        1.35      1.68     -0.00    3080.00    -0.00      6.48      0.59      0.73     -0.00    1342.88    -0.00      2.82
    99        0.99      1.67     -0.00    3070.00    -0.00      6.99      0.46      0.78     -0.00    1439.83    -0.00      3.28


   POWER          CO                 CO                THC                 NO                 NO                 NO
  PERCENT                              2                                                        2                  X
   RATED     LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR
   SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
    24          17.022          42521.270            28.740             -0.000             -0.000             72.203
    48           9.998          18416.957             4.658             -0.000             -0.000             35.644
    73           5.686          12924.734             7.050             -0.000             -0.000             27.188
    99           3.291          10204.320             5.541             -0.000             -0.000             23.241
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DATE:   5/27/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************

     CAL ID NUMBER:   96    ENGINE TYPE AND MODEL:  TSCP700-4              SERIAL NUMBER:    P-90123

                            RATED SHAFT HORSEPOWER:   142.

     FNGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: JP-5                FUEL H/C RATIO:   1.877

OPERATIONAL DATA ***********************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   89.00   FINISH   89.00

     ATMOSPHERIC PRESSURF:              START   28.72   FINISH   28.72

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0041

     RELATIVE HUMIDITY:                        18.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   6

COMMENTS:

 NORMAL MODE, COMBINATION LOAD




     TEST              POWER                  ENGINE           CORRECTED   GAS GEN     F/A       COMPRESSOR     COMPRESSOR     BLEED
     MODE     SHAFT            AIR             SPEED              FUEL     AIR FLOW    CALC        INLET        DISCHARGE     FLOW
               HP              HP               RPM               FLOW     LB/SEC      FROM        TEMP         PRESSURE      LB/MIN
                                           N1          N2         LB/HR              EMISSIONS   DFGREES F        PSIA

    22/ 0    140.00         1083.37    27300.00   35440.00       497.00      -0.00    0.015300      89.00         109.80        448.74
    19/22    103.10         1113.33    27300.00   35440.00       489.00      -0.00    0.014900      89.00         108.60        464.48
    15/19     70.00         1131.67    27300.00   35440.00       481.00      -0.00    0.014900      89.00         107.99        474.14
    10/15     35.60         1137.60    27300.00   35440.00       471.00      -0.00    0.015100      87.00         104.40        488.92
     5/10      0.0          1097.85    27340.00   35440.00       460.00      -0.00    0.015200      87.00         102.60        477.35
    25/ 5      0.0          1058.37    28100.00   35440.00       474.00      -0.00    0.013700      91.00         116.50        420.39


  POWER     EXHAUST      EXHAUST          CO         CO        THC       NO        NO         NO      ALDEHYDES    SMOKE    PARTICULATES
 PERCENT      GAS          GAS          (WET)         2       (WET)    (WET)        2          X
  RATED      TEMP       PRESSURE        PPMV       (WET)      PPMV     PPMV      (WET)      (WET)
  SHP     DEGREES F       PSIA                   PERCENT V                       PPMV       PPMV

   98      1005.00       -0.00         21.00       3.14      24.50     83.70      0.40      84.10     -0.00       -0.00       -0.00
   72      1005.00       -0.00         19.40       3.04      31.40     79.10      3.40      82.50     -0.00       -0.00       -0.00
   49      1005.00       -0.00         22.10       3.06      28.80     76.10      3.60      79.70     -0.00       -0.00       -0.00
   25      1005.00       -0.00         19.30       3.09      38.80     75.80      3.40      79.20     -0.00       -0.00       -0.00
    0      1005.00       -0.00         48.60       3.11      39.90     76.60      3.20      79.80     -0.00       -0.00       -0.00
    0       908.00       -0.00         27.70       2.81      23.60     75.00      4.10      79.10     -0.00       -0.00       -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS FMI  MASS EMI  MASS FMI  MASS FMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   94       1.30      0.87     -0.00    3070.00    -0.00      8.58      0.65      0.43     -0.00    1525.79    -0.00      4.26
   72       1.24      1.15     -0.00    3070.00    -0.00      8.69      0.61      0.56     -0.00    1501.23    -0.00      4.25
   49       1.41      1.05     -0.00    3070.00    -0.00      8.36      0.68      0.51     -0.00    1476.67    -0.00      4.02
   25       1.22      1.40     -0.00    3070.00    -0.00      8.20      0.57      0.66     -0.00    1445.97    -0.00      3.86
    0       3.05      1.43     -0.00    3060.00    -0.00      8.21      1.40      0.66     -0.00    1407.69    -0.00      3.77
    0       1.93      0.94     -0.00    3070.00    -0.00      9.05      0.91      0.44     -0.00    1455.18    -0.00      4.29


  POWER          CO                CO               THC               NO               NO                NO
 PERCENT                            2                                                   2                 X
  RATED     LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR      LB/1K HP-HR       LB/1K HP-HR
  SHP

   98          0.530           1247.206           0.353           -0.000           -0.000             3.494
   72          0.499           1234.129           0.463           -0.000           -0.000             3.493
   49          0.566           1228.853           0.421           -0.000           -0.000             3.347
   25          0.490           1232.504           0.562           -0.000           -0.000             3.292
    0          1.276           1282.145           0.598           -0.000           -0.000             3.438
    0          0.863           1374.920           0.420           -0.000           -0.000             4.051
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DATE:   6/14/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ******************************************************************************************

     CAL ID NUMBER:   42    ENGINE TYPE AND MODEL:  GTCP85-180             SERIAL NUMBER:    P-567

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                     0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                       0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                           0. HRS
          N2 COMPRESSOR OVERHAUL:                           0. HRS
          COMBUSTOR CAN REPLACEMENT:                        0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:           0. HRS
          N1 TURBINE OVERHAUL:                              0. HRS
          N2 TURBINE OVERHAUL:                              0. HRS

     FUEL: AV KEROS              FUEL H/C RATIO:   1.928

OPERATIONAL DATA *************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START  101.00   FINISH  101.00

     ATMOSPHERIC PRESSURE:              START   28.70   FINISH   28.70

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0050

     RELATIVE HUMIDITY:                     12.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY


    TEST           POWER                    ENGINE            CORRECTED   GAS GEN      F/A       COMPRESSOR      COMPRESSOR     BLEED
    MODE      SHAFT           AIR            SPEED               FUEL     AIR FLOW     CALC        INLET          DISCHARGE     FLOW
               HP             HP              RPM                FLOW     LB/SEC       FROM        TEMP           PRESSURE      LB/MIN
                                          N1          N2        LB/HR                EMISSIONS   DEGREES F          PSIA

    1/ 0      0.0            0.0      41700.00     -0.00       122.80      -0.00     0.006900      95.00            55.60        0.0
    6/ 1     39.90           0.0      41600.00     -0.00       137.00      -0.00     0.007900     100.00            55.10        0.0
   11/ 6     78.50           0.0      41400.00     -0.00       155.00      -0.00     0.009100     102.00            54.80        0.0
   16/11    116.90           0.0      41300.00     -0.00       177.00      -0.00     0.010500     102.00            54.40        0.0
   20/16    154.90           0.0      41100.00     -0.00       207.00      -0.00     0.011900     104.00            53.60        0.0


  POWER     EXHAUST      EXHAUST           CO         CO        THC        NO        NO         NO     ALDEHYDES    SMOKE    PARTICULATES
 PERCENT      GAS          GAS           (WET)         2       (WET)     (WET)        2          X
  RATED      TEMP       PRESSURE         PPMV       (WET)      PPMV      PPMV      (WET)      (WET)
   SHP    DEGREES F       PSIA                    PERCENT V                        PPMV       PPMV

    0       515.00       -0.00          146.80       1.41      26.30     12.00      6.70      18.70     -0.00      -0.00        -0.00
   24       585.00       -0.00          160.90       1.62      24.70     14.40      8.20      22.70     -0.00      -0.00        -0.00
   49       655.00       -0.00          180.80       1.85      20.80     20.10      0.40      28.50     -0.00      -0.00        -0.00
   73       730.00       -0.00          200.20       2.13      18.20     22.00     10.40      32.40     -0.00      -0.00        -0.00
   96       815.00       -0.00          235.70       2.42      27.30     26.50     11.60      38.00     -0.00      -0.00        -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2        NO       NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    0       20.29      2.07     -0.00    3070.00    -0.00      4.25       2.49      0.25     -0.00     377.00     -0.00      0.52
   24       19.42      1.70     -0.00    3070.00    -0.00   [illegible]   2.66      0.23     -0.00     420.59     -0.00      0.62
   49       19.01      1.25     -0.00    3060.00    -0.00   [illegible]   2.95      0.19     -0.00     474.30     -0.00      0.76
   73       18.33      0.95     -0.00    3060.00    -0.00      4.68       3.24      0.17     -0.00     541.62     -0.00      0.86
   96       18.92      1.25     -0.00    3050.00    -0.00      5.01       3.92      0.26     -0.00     631.35     -0.00      1.04


  POWER          CO               CO              THC              NO               NO              NO
 PERCENT                           2                                                 2               X
  RATED     LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR
   SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
   24          66.694        10541.094          5.841           -0.000           -0.000          15.431
   49          37.538         6042.031          2.470           -0.000           -0.000           9.723
   73          27.748         4633.188          1.444           -0.000           -0.000           7.384
   96          25.278         4075.854          1.674           -0.000           -0.000           6.702
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DATE: 6/14/71

TEST ORGANIZATION: AIRESEARCH

ENGINE SUPPLIER: AIRESEARCH

ENGINE DATA **

CAL ID NUMBER: 95 ENGINE TYPE AND MODEL: GTCP85-180 SERIAL NUMBER: P-567

RATED SHAFT HORSEPOWER: 160.

ENGINE TOTAL TIME: 0. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 0. HRS
N2 COMPRESSOR OVERHAUL: 0. HRS
COMBUSTOR CAN REPLACEMENT: 0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 0. HRS
N1 TURBINE OVERHAUL: 0. HRS
N2 TURBINE OVERHAUL: 0. HRS

FUEL: AV KEROS FUEL H/C RATIO: 1.928

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 110.00 FINISH 110.00

ATMOSPHERIC PRESSURE: START 28.70 FINISH 28.70

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0050

RELATIVE HUMIDITY: 12.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: -0.00

SAMPLE LINE TRANSPORT TIME, SEC: -0.00

NUMBER OF TESTS: 5

COMMENTS:

COMBINATION SHP/BLEED LOADING

TEST MODE	POWER SHAFT HP	POWER AIR HP	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	CORRECTED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	F/A CALC FROM EMISSIONS	COMPRESSOR INLET TEMP DEGREES F	COMPRESSOR DISCHARGE PRESSURE PSIA	BLEED FLOW LB/MIN
22/ 0	154.50	88.96	41000.00	-0.00	279.50	-0.00	0.016800	107.00	50.00	66.12
19/22	115.60	114.77	41000.00	-0.00	272.50	-0.00	0.015700	110.00	49.00	86.54
15/19	77.90	129.21	41100.00	-0.00	262.50	-0.00	0.015600	111.00	47.50	100.31
10/15	39.00	144.10	41200.00	-0.00	251.50	-0.00	0.016200	110.00	46.00	115.77
5/10	0.0	159.30	41200.00	-0.00	241.50	-0.00	0.016700	114.00	44.10	132.81

POWER PERCENT RATED SHP	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
96	1150.00	-0.00	222.90	3.40	6.80	44.70	10.50	55.10	-0.00	-0.00	-0.00
72	1150.00	-0.00	252.10	3.17	7.60	40.30	11.80	52.10	-0.00	-0.00	-0.00
48	1150.00	-0.00	577.90	3.16	8.50	37.30	13.80	51.50	-0.00	-0.00	-0.00
24	1150.00	-0.00	261.80	3.27	6.60	42.10	11.90	54.00	-0.00	-0.00	-0.00
0	1150.00	-0.00	248.40	3.38	5.60	44.60	11.90	55.50	-0.00	-0.00	-0.00

POWER PERCENT RATED SHP	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
96	12.64	0.22	-0.00	3030.00	-0.00	5.14	3.53	0.06	-0.00	846.88	-0.00	1.44
72	15.33	0.26	-0.00	3030.00	-0.00	5.21	4.18	0.07	-0.00	825.67	-0.00	1.42
48	16.93	0.30	-0.00	3030.00	-0.00	5.11	4.44	0.08	-0.00	795.37	-0.00	1.34
24	15.40	0.22	-0.00	3030.00	-0.00	5.22	3.87	0.06	-0.00	762.04	-0.00	1.31
0	14.13	0.18	-0.00	3020.00	-0.00	5.19	3.41	0.04	-0.00	729.33	-0.00	1.25

POWER PERCENT RATED SHP	CO LB/1K HP-HR	CO_2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO_2 LB/1K HP-HR	NO_x LB/1K HP-HR
96	14.516	3478.560	0.253	-0.000	-0.000	5.897
72	18.132	3584.189	0.311	-0.000	-0.000	6.161
48	21.455	3840.286	0.376	-0.000	-0.000	6.480
24	21.156	4161.965	0.306	-0.000	-0.000	7.169
0	21.421	4578.332	0.279	-0.000	-0.000	7.862

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DATE:   6/14/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:   43    ENGINE TYPE AND MODEL:  GTCP85-180              SERIAL NUMBER:    P-507

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: AV KEROS             FUEL H/C RATIO:   1.928

OPERATIONAL DATA ***************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START  104.00   FINISH  104.00

     ATMOSPHERIC PRESSURE:              START   28.58   FINISH   28.58

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0052

     RELATIVE HUMIDITY:                   12.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY



     TEST          POWER                    ENGINE             CORRECTED   GAS GEN     F/A        COMPRESSOR      COMPRESSOR    BLEED
     MODE      SHAFT          AIR            SPEED               FUEL      AIR FLOW    CALC         INLET         DISCHARGE     FLOW
                HP             HP             RPM                FLOW      LB/SEC      FROM         TEMP          PRESSURE      LB/MIN
                                        N1             N2       LB/HR                EMISSIONS   DEGREES F          PSIA

     1/ 0       0.0           0.0    41700.00       -0.00     116.00       -0.00    0.006500      105.00           54.20        0.0
     6/ 1      39.50          0.0    41400.00       -0.00     134.00       -0.00    0.007700      104.00           53.20        0.0
    11/ 6      79.00          0.0    41400.00       -0.00     153.00       -0.00    0.008700      104.00           53.20        0.0
    16/11     119.30          0.0    41100.00       -0.00     175.00       -0.00    0.010200      104.00           53.30        0.0
    20/16     157.80          0.0    41000.00       -0.00     194.00       -0.00    0.011600      104.00           53.30        0.0


   POWER    EXHAUST      EXHAUST         CO         CO        THC       NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
  PERCENT     GAS          GAS          (WET)        2       (WET)     (WET)       2         X
   RATED     TEMP        PRESSURE       PPMV       (WET)      PPMV      PPMV     (WET)     (WET)
   SHP     DEGREES F       PSIA                  PERCENT V                        PPMV      PPMV

     0      510.00        -0.00        125.30      1.33      16.90     11.40      5.90     17.30      -0.00       -0.00       -0.00
    24      580.00        -0.00        128.10      1.56      12.40     14.90      7.30     22.20      -0.00       -0.00       -0.00
    49      645.00        -0.00        140.40      1.78      11.50     17.70      8.50     26.20      -0.00       -0.00       -0.00
    74      710.00        -0.00        152.80      2.07       8.70     22.40     10.30     32.60      -0.00       -0.00       -0.00
    98      790.00        -0.00        177.30      2.35       7.10     27.20     10.90     38.10      -0.00       -0.00       -0.00


   POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
   RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

     0       18.45      1.42     -0.00   3080.00     -0.00      4.19      2.14      0.17     -0.00    357.28     -0.00      0.49
    24       16.05      0.89     -0.00   3080.00     -0.00      4.57      2.15      0.12     -0.00    412.72     -0.00      0.61
    49       15.44      0.72     -0.00   3070.00     -0.00      4.73      2.36      0.11     -0.00    469.71     -0.00      0.72
    74       14.38      0.47     -0.00   3070.00     -0.00      5.04      2.52      0.08     -0.00    537.25     -0.00      0.88
    98       14.66      0.33     -0.00   3060.00     -0.00      5.17      2.84      0.06     -0.00    593.64     -0.00      1.00


   POWER         CO              CO              THC              NO              NO              NO
  PERCENT                         2                                                2               X
   RATED    LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR
   SHP

  *****HORSEPOWER-HR BASIS NOT CALCULABLE*****
    24        54.434         10448.607          3.012          -0.000          -0.000          15.507
    49        29.903          5945.695          1.398          -0.000          -0.000           9.168
    74        21.091          4503.352          0.684          -0.000          -0.000           7.396
    98        18.018          3761.976          0.409          -0.000          -0.000           6.354
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DATE:  6/14/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

      CAL ID NUMBER:   94     ENGINE TYPE AND MODEL:  GTCP85-180                 SERIAL NUMBER:     P-507

                                   RATED SHAFT HORSEPOWER:   160.

      ENGINE TOTAL TIME:                                       0. HRS

      TIME SINCE HOT SECTION OVERHAUL:                         0. HRS

      TIME SINCE:

            N1 COMPRESSOR OVERHAUL:                            0. HRS
            N2 COMPRESSOR OVERHAUL:                            0. HRS
            COMBUSTOR CAN REPLACEMENT:                         0. HRS
            FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:            0. HRS
            N1 TURBINE OVERHAUL:                               0. HRS
            N2 TURBINE OVERHAUL:                               0. HRS

      FUEL: AV KEROS              FUEL H/C RATIO:    1.928

OPERATIONAL DATA ***********************************************************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   107.00    FINISH  107.00

      ATMOSPHERIC PRESSURE:              START    28.58    FINISH   28.58

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0052

      RELATIVE HUMIDITY:                        12.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    -0.00

      SAMPLE LINE TRANSPORT TIME, SEC:    -0.00

NUMBER OF TESTS:   5

COMMENTS:

 COMBINATION SHP/BLEED LOADING



   TEST           POWER                   ENGINE             CORRECTED   GAS GEN     F/A       COMPRESSOR      CCMPRESSOR    BLEED
   MODE      SHAFT            AIR          SPEED               FUEL      AIR FLOW    CALC        INLET          DISCHARGE     FLOW
              HP              HP            RPM                FLOW      LB/SEC      FROM        TEMP           PRESSURE      LB/MIN
                                      N1             N2        LB/HR               EMISSIONS   DEGREES F          PSIA

   22/ 0    156.30          93.41  40600.00       -0.00      271.50      -0.00    0.016400     105.00           49.70        70.08
   19/22    117.80         117.17  40600.00       -0.00      271.50      -0.00    0.016300     107.00           48.60        89.54
   15/19     77.40         135.59  40600.00       -0.00      260.50      -0.00    0.016200     108.00           46.90       107.18
   10/15     38.90         152.47  40700.00       -0.00      252.50      -0.00    0.016500     108.00           45.60       124.04
    5/10      0.0          161.62  40800.00       -0.00      235.00      -0.00    0.016900     107.00           43.70       137.74


 POWER    FXHAUST      EXHAUST         CO         CO        THC       NO        NO        NO     ALDEHYDES   SMOKF   PARTICULATES
 PERCENT    GAS          GAS          (WET)        2       (WET)     (WET)       2         X
 RATED      TEMP       PRESSURF       PPMV      (WET)      PPMV      PPMV      (WET)     (WET)
 SHP     DFGREES F       PSIA                 PERCENT V                        PPMV      PPMV

   97     1150.00       -0.00        174.30     33.40      1.00      44.40     10.00     54.40     -0.00      -0.00       -0.00
   73     1150.00       -0.00        194.50      3.30      2.10      43.50      9.40     53.00     -0.00      -0.00       -0.00
   48     1150.00       -0.00        194.60      3.29      2.50      41.70     10.00     51.70     -0.00      -0.00       -0.00
   24     1150.00       -0.00        198.70      3.34      2.20      43.00      9.10     52.10     -0.00      -0.00       -0.00
    0     1150.00       -0.00        193.10      3.43      2.00      43.20      9.50     52.70     -0.00      -0.00       -0.00


 POWER     MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED      LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 SHP       LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   97       10.08      0.03     -0.00   3030.00     -0.00      5.16      2.74      0.01     -0.00    922.64     -0.00      1.40
   73       11.36      0.07     -0.00   3030.00     -0.00      5.09      3.08      0.02     -0.00    822.64     -0.00      1.38
   48       11.42      0.08     -0.00   3030.00     -0.00      4.98      2.99      0.02     -0.00    789.31     -0.00      1.30
   24       11.48      0.07     -0.00   3030.00     -0.00      4.94      2.90      0.02     -0.00    765.07     -0.00      1.25
    0       10.85      0.06     -0.00   3030.00     -0.00      4.87      2.55      0.02     -0.00    712.05     -0.00      1.14


 POWER          CO                 CO                 THC                 NO                 NO                 NO
 PERCENT                            2                                                         2                  X
 RATED     LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR
 SHP

   97         10.964            3294.440             0.035              -0.000             -0.000              5.616
   73         13.124            3501.055             0.083              -0.000             -0.000              5.871
   48         13.971            3705.883             0.104              -0.000             -0.000              6.096
   24         15.142            3997.856             0.098              -0.000             -0.000              6.515
    0         15.780            4405.586             0.093              -0.000             -0.000              7.078
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DATE:   6/15/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:   44    ENGINE TYPE AND MODEL:  GTCP85-180              SERIAL NUMBER:   P-518

                             RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                   0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         0. HRS
          N2 COMPRESSOR OVERHAUL:                         0. HRS
          COMBUSTOR CAN REPLACEMENT:                      0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
          N1 TURBINE OVERHAUL:                            0. HRS
          N2 TURBINE OVERHAUL:                            0. HRS

     FUEL: AV KEROS              FUEL H/C RATIO:   1.928

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   97.00   FINISH   97.00

     ATMOSPHERIC PRESSURE:              START   28.63   FINISH   28.63

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0046

     RELATIVE HUMIDITY:                    13.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY



     TEST          POWER                   ENGINE             CORRECTED   GAS GEN     F/A        COMPRESSOR      COMPRESSOR     BLEED
     MODE      SHAFT        AIR            SPEED                FUEL      AIR FLOW    CALC         INLET          DISCHARGE     FLOW
                 HP          HP             RPM                 FLOW      LB/SEC      FROM          TEMP          PRESSURE      LB/MIN
                                            N1          N2      LB/HR                 EMISSIONS   DEGREES F         PSIA

     1/ 0       0.0         0.0        41600.00     -0.00     119.00      -0.00     0.006800      96.00          54.80         0.0
     6  1      40.80        0.0        41500.00     -0.00     138.00      -0.00     0.007900      96.00          54.60         0.0
    11/ 6      79.30        0.0        41300.00     -0.00     157.00      -0.00     0.009200      98.00          53.90         0.0
    16/11     118.30        0.0        41100.00     -0.00     176.00      -0.00     0.010400      98.00          53.50         0.0
    20/16     158.30        0.0        41000.00     -0.00     201.50      -0.00     0.012200      99.00          53.00         0.0


   POWER     EXHAUST      EXHAUST          CO         CO         THC        NO         NO         NO      ALDEHYDES    SMOKE    PARTICULATES
  PERCENT      GAS          GAS           (WET)        2        (WET)      (WET)        2          X
   RATED       TEMP       PRESSURE        PPMV       (WET)      PPMV       PPMV       (WET)      (WET)
   SHP      DEGREES F       PSIA                   PERCENT V                          PPMV       PPMV

     0        490.00       -0.00         160.80       1.39       4.00       8.40       8.80      17.20      -0.00      -0.00        -0.00
    25        565.00       -0.00         199.00       1.61       5.10      10.20      11.50      21.70      -0.00      -0.00        -0.00
    49        635.00       -0.00         255.30       1.87       6.30      12.50      12.70      25.20      -0.00      -0.00        -0.00
    73        710.09       -0.00         266.10       2.10       5.30      15.40      15.50      30.90      -0.00      -0.00        -0.00
    98        805.00       -0.00         311.50       2.47       4.30      19.50      14.40      34.00      -0.00      -0.00        -0.00


   POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
   RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

     0       22.59      0.32     -0.00   3070.00     -0.00      3.97      2.69      0.04     -0.00    365.33     -0.00      0.47
    25       24.06      0.35     -0.00   3060.00     -0.00      4.31      3.32      0.05     -0.00    422.28     -0.00      0.59
    49       26.48      0.38     -0.00   3050.00     -0.00      4.29      4.16      0.06     -0.00    478.85     -0.00      0.67
    73       24.53      0.28     -0.00   3050.00     -0.00      4.68      4.32      0.05     -0.00    536.80     -0.00      0.82
    98       24.37      0.19     -0.00   3040.00     -0.00      4.36      4.91      0.04     -0.00    612.56     -0.00      0.88


   POWER          CO              CO              THC              NO              NO              NO
  PERCENT                          2                                                2               X
   RATED     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR
   SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
    25         81.369        10349.992          1.197          -0.000          -0.000          14.581
    49         52.422         6038.461          0.744          -0.000          -0.000           8.503
    73         36.496         4537.613          0.412          -0.000          -0.000           6.963
    98         31.015         3869.614          0.247          -0.000          -0.000           5.554
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DATE:   6/15/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

    CAL ID NUMBER:   93    ENGINE TYPE AND MODEL:  GTCP85-180                   SERIAL NUMBER:    P-518

                           RATED SHAFT HORSEPOWER:   160.

    ENGINE TOTAL TIME:                                 0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                       0. HRS
         N2 COMPRESSOR OVERHAUL:                       0. HRS
         COMBUSTOR CAN REPLACEMENT:                    0. HPS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HAS
         N1 TURBINE OVERHAUL:                          0. HRS
         N2 TURBINE OVERHAUL:                          0. HRS

    FUEL: AV KEROS             FUEL H/C RATIO:   1.928
OPERATIONAL DATA ***********************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START  109.00   FINISH  109.00

    ATMOSPHERIC PRESSURE:              START   28.63   FINISH   28.63

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0046

    RELATIVE HUMIDITY:                   13.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

    SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

 NUMBER OF TESTS:   5

 COMMENTS:

  COMBINATION SHP/BLEED LOADING



  TEST         POWER              ENGINE            CORRECTED  GAS GEN     F/A      COMPRESSOR    COMPRESSOR   BLEED
  MODE     SHAFT       AIR         SPEED              FUEL     AIR FLOW   CALC        INLET       DISCHARGE    FLOW
            HP          HP          RPM               FLOW     LB/SEC     FROM        TEMP        PRESSURE     LB/MIN
                                 N1          N2       LB/HR               EMISSIONS   DEGREES F     PSIA

  22/ 0    156.80       97.61  40600.00    -0.00     281.50     -0.00    0.018300     103.00        49.80       73.35
  19/22    117.20      117.67  40700.00    -0.00     266.50     -0.00    0.016900     110.00        49.00       88.73
  15/19     78.30      134.40  40800.00    -0.00     261.50     -0.00    0.016600     110.00        47.70      104.08
  10/15     39.10      151.38  40800.00    -0.00     253.50     -0.00    0.017000     110.00        46.40      120.55
   5/10      0.0       163.84  40900.00    -0.00     248.50     -0.00    0.017300     110.00        44.70      135.61


  POWER    EXHAUST    EXHAUST        CO        CO       THC      NO       NO       NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS        GAS         (WET)        2     (WET)    (WET)       2        X
  RATED     TEMP      PRESSURE      PPMV      (WET)     PPMV     PPMV    (WET)    (WET)
   SHP    DEGREES F    PSIA                  PERCENT V                   PPMV     PPMV

   97      1150.00     -0.00       187.20      3.70      0.60    48.30     9.40    57.70    -0.00      -0.00      -0.00
   73      1150.00     -0.00       282.90      3.41      7.10    39.80    10.20    50.00    -0.00      -0.00      -0.00
   48      1150.00     -0.00       298.20      3.36      9.70    36.80    12.40    49.30    -0.00      -0.00      -0.00
   24      1150.00     -0.00       314.60      3.42     11.10    37.00    12.10    49.10    -0.00      -0.00      -0.00
    0      1150.00     -0.00       309.40      3.48      9.80    37.80    11.50    49.30    -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K    LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   97        9.74      0.02     -0.00   3020.00     -0.00      4.93      2.74      0.00     -0.00    850.13     -0.00      1.39
   73       15.93      0.23     -0.00   3020.00     -0.00      4.63      4.28      0.06     -0.00    810.87     -0.00      1.24
   48       17.04      0.32     -0.00   3020.00     -0.00      4.63      4.46      0.08     -0.00    789.71     -0.00      1.21
   24       17.64      0.35     -0.00   3020.00     -0.00      4.53      4.47      0.09     -0.00    765.57     -0.00      1.15
    0       17.05      0.31     -0.00   3020.00     -0.00      4.46      4.24      0.08     -0.00    750.47     -0.00      1.11


  POWER          CO               CO              THC              NO               NO               NO
 PERCENT                            2                                                 2                X
  RATED     LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR
   SHP

   97          10.778         3341.578          0.019           -0.000           -0.000            5.454
   73          18.210         3452.418          0.262           -0.000           -0.000            5.287
   48          20.956         3712.895          0.390           -0.000           -0.000            5.637
   24          23.480         4019.110          0.472           -0.000           -0.000            6.025
    0          25.855         4580.398          0.469           -0.000           -0.000            6.770
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DATE:   6/15/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:   45    ENGINE TYPE AND MODEL:  GTCP85-180              SERIAL NUMBER:    P-595

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                   0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         0. HRS
          N2 COMPRESSOR OVERHAUL:                         0. HRS
          COMBUSTOR CAN REPLACEMENT:                      0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
          N1 TURBINE OVERHAUL:                            0. HRS
          N2 TURBINE OVERHAUL:                            0. HRS

     FUEL: AV KEROS              FUEL H/C RATIO:   1.928

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START  106.00   FINISH  106.00

     ATMOSPHERIC PRESSURE:              START   28.64   FINISH   28.64

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0046

     RELATIVE HUMIDITY:                    9.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIMF, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY



     TEST            POWER                  ENGINE              CORRECTED   GAS GEN     F/A        COMPRESSOR      COMPRESSOR     BLEED
     MODE       SHAFT           AIR          SPEED                FUEL      AIR FLOW    CALC         INLET          DISCHARGE     FLOW
                 HP             HP            RPM                 FLOW      LB/SEC      FROM         TEMP           PRESSURE      LB/MIN
                                        N1            N2          LB/HR                 EMISSIONS    DEGREES F        PSIA

     1/ 0        0.0            0.0     41600.00     -0.00       114.00      -0.00      0.006800     105.00          53.40         0.0
     6/ 1       40.70           0.0     41400.00     -0.00       133.00      -0.00      0.007700     106.00          52.90         0.0
    11/ 6       79.10           0.0     41200.00     -0.00       153.00      -0.00      0.009100     107.00          52.60         0.0
    16/11      118.30           0.0     41100.00     -0.00       174.00      -0.00      0.010300     107.00          52.40         0.0
    20/16      157.90           0.0     40900.00     -0.00       205.00      -0.00      0.012000     107.00          51.90         0.0

   POWER     EXHAUST       EXHAUST           CO          CO          THC        NO         NO          NO     ALDEHYDES    SHOKE   PARTICULATES
  PERCENT      GAS           GAS            (WET)         2         (WET)      (WET)        2           X
   RATED      TEMP         PRESSURE          PPMV       (WET)        PPMV       PPMV       (WET)       (WET)
    SHP     DEGREES F        PSIA                     PERCENT V                            PPMV        PPMV

     0       580.00         -0.00           190.90       1.38        50.80       8.70       8.70       17.40      -0.00      -0.00       -0.00
    25       580.00         -0.00           227.30       1.55        55.50      11.20      11.20       22.40      -0.00      -0.00       -0.00
    49       660.00         -0.00           273.00       1.83        56.30      13.10      12.50       25.60      -0.00      -0.00       -0.00
    73       740.00         -0.00           261.20       2.08        49.00      17.30      14.10       31.30      -0.00      -0.00       -0.00
    98       850.00         -0.00           288.30       2.42        36.90      23.30      15.30       38.60      -0.00      -0.00       -0.00

   POWER     MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT       CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2       NO        NOX
   RATED      LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
    SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

     0        27.00      4.10     -0.00    3060.00    -0.00      4.03      3.08      0.47     -0.00     348.84    -0.00      0.46
    25        28.51      3.98     -0.00    3050.00    -0.00      4.63      3.79      0.53     -0.00     405.65    -0.00      0.62
    49        28.88      3.39     -0.00    3040.00    -0.00      4.44      4.42      0.52     -0.00     465.12    -0.00      0.68
    73        24.37      2.61     -0.00    3040.00    -0.00      4.80      4.24      0.46     -0.00     528.96    -0.00      0.84
    98        22.98      1.68     -0.00    3040.00    -0.00      5.06      4.71      0.35     -0.00     623.20    -0.00      1.04

   POWER          CO                CO               THC                NO                 NO                NO
  PERCENT                            2                                                      2                 X
   RATED     LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR
    SHP

*****HORSFPOWER-HR BASIS NOT CALCULABLE*****
    25         93.169          9966.820           12.999             -0.000             -0.000            15.117
    49         55.856          5880.148            6.567             -0.000             -0.000             8.592
    73         35.846          4471.340            3.846             -0.000             -0.000             7.066
    98         29.841          3946.800            2.186             -0.000             -0.000             6.567
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DATE: 6/15/71

TEST ORGANIZATION: AIRESEARCH

ENGINE SUPPLIER: AIRESEARCH

ENGINE DATA **

CAL ID NUMBER: 92 ENGINE TYPE AND MODEL: GTCP85-180 SERIAL NUMBER: P-595

RATED SHAFT HORSEPOWER: 160.

ENGINE TOTAL TIME: 0. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 0. HRS
N2 COMPRESSOR OVERHAUL: 0. HRS
COMBUSTOR CAN REPLACEMENT: 0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 0. HRS
N1 TURBINE OVERHAUL: 0. HRS
N2 TURBINE OVERHAUL: 0. HRS

FUEL: AV KEROS FUEL H/C RATIO: 1.928

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 111.00 FINISH 111.00

ATMOSPHERIC PRESSURE: START 28.64 FINISH 28.64

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0046

RELATIVE HUMIDITY: 9.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: -0.00

SAMPLE LINE TRANSPORT TIME, SEC: -0.00

NUMBER OF TESTS: 5

COMMENTS:

COMBINATION SHP/BLEED LOADING

TEST MODE	POWER SHAFT HP	POWER AIR HP	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	CORRECTED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	F/A CALC FROM EMISSIONS	COMPRESSOR INLET TEMP DEGREES F	COMPRESSOR DISCHARGE PRESSURE PSIA	BLEED FLOW LB/MIN
22/ 0	157.20	85.38	40700.00	-0.00	266.50	-0.00	0.017600	112.00	49.60	63.40
19/22	117.20	116.26	40700.00	-0.00	261.50	-0.00	0.016300	112.00	49.70	86.16
15/19	78.30	137.73	40800.00	-0.00	264.50	-0.00	0.016000	110.00	48.50	104.91
10/15	40.10	149.20	40800.00	-0.00	251.50	-0.00	0.016100	110.00	47.20	116.77
5/10	0.0	164.95	40800.00	-0.00	241.50	-0.00	0.016400	110.00	45.70	133.42

POWER PERCENT RATED SHP	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
98	1150.00	-0.00	197.30	3.55	6.30	51.60	8.80	60.40	-0.00	-0.00	-0.00
73	1150.00	-0.00	265.70	3.30	5.70	43.10	11.10	54.20	-0.00	-0.00	-0.00
48	1150.00	-0.00	289.60	3.23	7.90	37.90	15.00	52.80	-0.00	-0.00	-0.00
25	1150.00	-0.00	324.30	3.25	13.00	35.40	14.70	50.10	-0.00	-0.00	-0.00
0	1150.00	-0.00	331.50	3.32	14.80	35.60	14.60	50.20	-0.00	-0.00	-0.00

POWER PERCENT RATED SHP	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
98	10.68	0.19	-0.00	3020.00	-0.00	5.37	2.85	0.05	-0.00	804.83	-0.00	1.43
73	15.49	0.19	-0.00	3020.00	-0.00	5.19	4.05	0.05	-0.00	789.73	-0.00	1.36
48	17.24	0.27	-0.00	3020.00	-0.00	5.17	4.56	0.07	-0.00	798.79	-0.00	1.37
25	19.20	0.44	-0.00	3020.00	-0.00	4.87	4.83	0.11	-0.00	759.53	-0.00	1.22
0	19.20	0.49	-0.00	3020.00	-0.00	4.78	4.64	0.12	-0.00	729.33	-0.00	1.15

POWER PERCENT RATED SHP	CO LB/1K HP-HR	CO_2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO_2 LB/1K HP-HR	NO_x LB/1K HP-HR
98	11.736	3317.750	0.213	-0.000	-0.000	5.902
73	17.353	3382.688	0.212	-0.000	-0.000	5.816
48	21.108	3697.595	0.328	-0.000	-0.000	6.325
25	25.507	4012.324	0.586	-0.000	-0.000	6.466
0	28.113	4421.480	0.717	-0.000	-0.000	6.995

```
DATE:   6/16/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  46    ENGINE TYPE AND MODEL:  GTCP85-180              SERIAL NUMBER:    P-593

                           RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: AV KEROS            FUEL H/C RATIO:   1.928

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   97.00   FINISH   97.00

     ATMOSPHERIC PRESSURE:              START   28.62   FINISH   28.62

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0042

     RELATIVE HUMIDITY:                   15.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:   .

 SHP LOADING ONLY



    TEST           POWER                  FNGINE             CORRECTED   GAS GEN     F/A        COMPRESSOR      COMPRESSOR    BLEED
    MODE      SHAFT           AIR          SPEED               FUEL      AIR FLOW    CALC         INLET         DISCHARGE     FLOW
               HP             HP            RPM                FLOW      LB/SEC      FROM         TEMP          PRESSURE      LB/MIN
                                        N1          N2         LB/HR                EMISSIONS   DEGREES F         PSIA

     1/ 0      0.0            0.0     41600.00     -0.00      118.00      -0.00     0.006700      94.00           55.40         0.0
     6/ 1     39.70           0.0     41400.00     -0.00      139.00      -0.00     0.008100      95.00           54.40         0.0
    11/ 6     79.10           0.0     41200.00     -0.00      156.00      -0.00     0.009200      98.00           54.10         0.0
    16/11    118.60           0.0     41200.00     -0.00      180.00      -0.00     0.010400      98.00           54.20         0.0
    20/16    158.30           0.0     41000.00     -0.00      208.00      -0.00     0.012000      98.00           54.00         0.0

  POWER    EXHAUST      EXHAUST          CO          CO         THC        NO         NO         NO      ALDEHYDES   SMOKF   PARTICULATES
 PERCENT     GAS          GAS          (WET)          2        (WET)      (WET)        2          X
  RATED      TEMP       PRESSURE        PPMV       (WET)        PPMV       PPMV      (WET)      (WET)
  SHP     DEGREES F       PSIA                   PERCENT V                            PPMV       PPMV

    0       500.00       -0.00         143.50        1.36       25.00      10.10       7.40      17.50     -0.00      -0.00       -0.00
   24       585.00       -0.00         164.80        1.64       26.40      14.70       9.80      24.50     -0.00      -0.00       -0.00
   49       655.00       -0.00         185.70        1.87       24.50      17.70      11.00      28.70     -0.00      -0.00       -0.00
   74       740.00       -0.00         206.70        2.12       22.40      21.30      12.20      33.60     -0.00      -0.00       -0.00
   98       830.00       -0.00      [illegible]36.90        2.45       19.00      25.80      13.00      38.80     -0.00      -0.00       -0.00

  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS FMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2        NO       NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    0       20.58      2.05     -0.00    3070.00    -0.00      4.12      2.43      0.24     -0.00     362.26    -0.00      0.49
   24       19.60      1.79     -0.00    3070.00    -0.00      4.80      2.72      0.25     -0.00     426.73    -0.00      0.67
   49       19.39      1.46     -0.00    3060.00    -0.00      4.92      3.02      0.23     -0.00     477.36    -0.00      0.77
   74       18.96      1.18     -0.00    3050.00    -0.00      5.06      3.41      0.21     -0.00     549.00    -0.00      0.91
   98       18.75      0.86     -0.00    3050.00    -0.00      5.04      3.90      0.18     -0.00     634.40    -0.00      1.05

  POWER          CO                 CO                THC               NO                NO                NO
 PERCENT                             2                                                     2                 X
  RATED     LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
  SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
   24         68.635          10748.859            6.281            -0.000            -0.000            16.799
   49         38.243           6034.891            2.887            -0.000            -0.000             9.713
   74         28.783           4629.000            1.786            -0.000            -0.000             7.677
   98         24.641           4007.579            1.131            -0.000            -0.000             6.625
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DATE:  6/16/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ***********************************************************************************************************

     CAL ID NUMBER:   65    ENGINE TYPE AND MODEL:  GTCP85-180             SERIAL NUMBER:    P-593

                                   RATED SHAFT HORSEPOWER:    160.

     ENGINE TOTAL TIME:                                         0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                           0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                               0. HRS
          N2 COMPRESSOR OVERHAUL:                               0. HRS
          COMBUSTOR CAN REPLACEMENT:                            0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:               0. HRS
          N1 TURBINE OVERHAUL:                                  0. HRS
          N2 TURBINE OVERHAUL:                                  0. HRS

     FUEL: AV KEROS            FUEL H/C RATIO:   1.928

OPERATIONAL DATA ******************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   104.00    FINISH   104.00

     ATMOSPHERIC PRESSURE:              START    28.62    FINISH    28.62

     INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0042

     RELATIVE HUMIDITY:                          15.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   6

COMMENTS:

 COMBINATION SHP/BLEED LOADING



      TEST            POWER                  ENGINE                 CORRECTED    GAS GEN      F/A        COMPRESSOR       COMPRESSOR     BLEED
      MODE      SHAFT           AIR           SPEED                    FUEL      AIR FLOW     CALC         INLET          DISCHARGE      FLOW
                 HP             HP             RPM                     FLOW      LB/SEC       FROM         TEMP           PRESSURE       LB/MIN
                                          N1             N2            LB/HR                EMISSIONS   DEGREES F           PSIA

     22/ 0     157.50          89.64    40800.00       -0.00          276.50       -0.00     0.016500     100.00            52.50         64.40
     19/22     117.70         118.21    40900.00       -0.00          268.50       -0.00     0.016300     101.00            51.60         86.16
     15/19      78.50         134.60    40900.00       -0.00          256.50       -0.00     0.016200     108.00            49.90        100.06
     10/15      39.30         151.98    41000.00       -0.00          248.50       -0.00     0.016000     106.00            48.90        115.64
      5/10       0.0          167.56     4100.00       -0.00          241.50       -0.00     0.016500     105.00            47.10        132.58
      3/ 5       0.0          132.95    41300.00       -0.00          206.50       -0.00     0.012700     104.00            49.80         99.73


     POWER    EXHAUST       EXHAUST           CO          CO          THC        NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
    PERCENT     GAS           GAS            (WET)         2         (WET)      (WET)        2           X
     RATED      TEMP        PRESSURE         PPMV        (WET)       PPMV       PPMV       (WET)       (WET)
     SHP     DEGREES F        PSIA                     PERCENT V                           PPMV        PPMV

      98      1150.00        -0.00          200.60        3.35        4.20      44.90      10.10       55.00      -0.00       -0.00       -0.00
      73      1150.00        -0.00          214.30        3.30        3.30      44.50       9.70       54.20      -0.00       -0.00       -0.00
      49      1150.00        -0.00          247.70        3.27        4.80      39.80      12.10       51.90      -0.00       -0.00       -0.00
      24      1150.00        -0.00          258.70        3.23        6.40      39.00      11.80       50.90      -0.00       -0.00       -0.00
       0      1150.00        -0.00          265.70        3.35        8.10      38.90      11.90       50.80      -0.00       -0.00       -0.00
       0       950.00        -0.00          300.00        2.56       25.80      24.20      14.00       38.20      -0.00       -0.00       -0.00


     POWER     MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
    PERCENT       CO        HC       NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO       NOX
     RATED      LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
     SHP       LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

      98        11.55      0.14     -0.00   3030.00     -0.00      5.20      3.19      0.04     -0.00    837.79     -0.00      1.44
      73        12.50      0.11     -0.00   3030.00     -0.00      5.19      3.36      0.03     -0.00    813.55     -0.00      1.39
      49        14.59      0.16     -0.00   3030.00     -0.00      5.02      3.74      0.04     -0.00    777.19     -0.00      1.29
      24        15.44      0.22     -0.00   3030.00     -0.00      4.98      3.84      0.05     -0.00    752.95     -0.00      1.24
       0        15.28      0.26     -0.00   3020.00     -0.00      4.80      3.69      0.06     -0.00    729.33     -0.00      1.16
       0        22.62      1.11     -0.00   3030.00     -0.00      4.73      4.67      0.23     -0.00    625.69     -0.00      0.98


     POWER         CO                CO                THC                 NO                 NO                 NO
    PERCENT                           2                                                          2                  X
     RATED     LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR
     SHP

      98         12.922          3389.917             0.153             -0.000             -0.000              5.920
      73         14.229          3448.653             0.126             -0.000             -0.000              5.907
      49         17.558          3647.128             0.196             -0.000             -0.000              6.044
      24         20.054          3936.486             0.283             -0.000             -0.000              6.476
       0         22.020          4352.762             0.382             -0.000             -0.000              6.913
       0         35.135          4706.230             1.724             -0.000             -0.000              7.347
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DATE:   6/ 7/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA **************************************************************************************************

    CAL ID NUMBER:   47    ENGINE TYPE AND MODEL:  GTCP85-98CK            SERIAL NUMBER:     P-35648

                           RATED SHAFT HORSEPOWER:   160.

    ENGINE TOTAL TIME:                                   0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                         0. HRS
         N2 COMPRESSOR OVERHAUL:                         0. HRS
         COMBUSTOR CAN REPLACEMENT:                      0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
         N1 TURBINE OVERHAUL:                            0. HRS
         N2 TURBINE OVERHAUL:                            0. HRS

    FUEL: AV KEROS              FUEL H/C RATIO:   1.928

OPERATIONAL DATA *********************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   96.00   FINISH   96.00

    ATMOSPHERIC PRESSURE:              START   28.65   FINISH   28.65

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0019

    RELATIVE HUMIDITY:                    6.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

    SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY



  TEST          POWER               ENGINE           CORRECTED   GAS GEN     F/A       COMPRESSOR      COMPRESSOR    BLEED
  MODE    SHAFT          AIR        SPEED              FUEL      AIR FLOW    CALC        INLET          DISCHARGE    FLOW
           HP            HP          RPM               FLOW      LB/SEC      FROM        TEMP           PRESSURE     LB/MIN
                                  N1         N2        LB/HR                EMISSIONS   DEGREES F         PSIA

   1/ 0     0.0          0.0   41500.00    -0.00      122.00      -0.00     0.007200      90.00           53.90        0.0
   6/ 1    39.70         0.0   41400.00    -0.00      141.60      -0.00     0.008400      93.00           53.40        0.0
  11/ 6    78.30         0.0   41300.00    -0.00      161.80      -0.00     0.009600      95.00           52.90        0.0
  16/11   117.30         0.0   41100.00    -0.00      184.00      -0.00     0.010900      98.00           52.40        0.0
  20/16   155.40         0.0   41000.00    -0.00      214.00      -0.00     0.013100     104.00           51.90        0.0


 POWER    EXHAUST     EXHAUST        CO         CO        THC        NO        NO        NO    ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS         GAS         (WET)        2       (WET)     (WET)        2         X
 RATED     TEMP       PRESSURE      PPMV      (WET)      PPMV      PPMV      (WET)     (WET)
  SHP    DEGREES F      PSIA               PERCENT V                          PPMV      PPMV

    0      560.00      -0.00       160.70      1.45      61.10      1.20      6.50      7.70    -0.00     -0.00      -0.00
   24      630.00      -0.00       164.90      1.71      41.50      9.50      7.70     17.20    -0.00     -0.00      -0.00
   48      700.00      -0.00       168.70      1.96      29.20     12.80      7.80     20.60    -0.00     -0.00      -0.00
   73      805.00      -0.00       179.80      2.22      22.00     17.40      8.00     25.40    -0.00     -0.00      -0.00
   97      930.00      -0.00       212.90      2.66      19.60     22.40      8.20     30.60    -0.00     -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    0      21.55      4.68     -0.00   3060.00     -0.00      1.69      2.63      0.57     -0.00    373.32     -0.00      0.21
   24      18.83      2.71     -0.00   3060.00     -0.00      3.22      2.67      0.38     -0.00    433.30     -0.00      0.46
   48      16.81      1.66     -0.00   3060.00     -0.00      3.36      2.72      0.27     -0.00    495.11     -0.00      0.54
   73      15.78      1.10     -0.00   3060.00     -0.00      3.66      2.90      0.20     -0.00    563.04     -0.00      0.67
   97      15.53      0.82     -0.00   3040.00     -0.00      3.67      3.32      0.17     -0.00    650.56     -0.00      0.78


 POWER        CO                CO               THC               NO                NO                NO
PERCENT                          2                                                    2                 X
 RATED    LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR
 SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
   24        67.180        10914.246           9.669           -0.000           -0.000           11.478
   48        34.728         6323.219           3.434           -0.000           -0.000            6.951
   73        24.750         4799.996           1.729           -0.000           -0.000            5.738
   97        21.392         4186.355           1.124           -0.000           -0.000            5.050
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DATE:   6/ 7/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:   66   ENGINE TYPE AND MODEL:  GTCP85-98CK              SERIAL NUMBER:    P-35648

                           RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLF GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURRINE OVERHAUL:                           0. HRS

     FUEL: AV KEROS              FUEL H/C RATIO:   1.928

OPERATIONAL DATA ***************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START  123.00   FINISH  123.00

     ATMOSPHERIC PRESSURE:              START   28.65   FINISH   28.65

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0019

     RELATIVE HUMIDITY:                    6.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 COMBINATION SHP/BLEED LOADING



    TEST           POWER                  ENGINE              CORRECTED   GAS GEN      F/A       COMPRESSOR      COMPRESSOR     BLEED
    MODE       SHAFT         AIR           SPEED                FUEL      AIR FLOW     CALC        INLET          DISCHARGE     FLOW
                HP            HP            RPM                 FLOW      LB/SEC       FROM        TEMP           PRESSURE      LB/MIN
                                       N1           N2          LB/HR                EMISSIONS   DEGREES F          PSIA

    22/ 0     154.30        51.97   40700.00      -0.00        258.00      -0.00     0.017800      130.30           48.20        38.46
    19/22     116.50        73.63   40800.00      -0.00        244.00      -0.00     0.017100      125.00           47.70        55.56
    15/19      77.30       104.85   40800.00      -0.00        244.00      -0.00     0.017300      126.00           46.50        81.04
    10/15      39.10       128.35   40800.00      -0.00        242.00      -0.00     0.017300      120.00           46.00       101.34
     5/10       0.0        144.48   40800.00      -0.00        234.00      -0.00     0.016800      114.00           45.00       117.92

   POWER    EXHAUST      EXHAUST          CO         CO        THC        NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
  PERCENT     GAS          GAS           (WET)        2        (WET)     (WET)       2         X
   RATED      TEMP       PRESSURE        PPMV       (WET)       PPMV      PPMV      (WET)     (WET)
   SHP     DEGREES F       PSIA                   PERCENT V                         PPMV      PPMV

    96      1210.00       -0.00         196.20      3.59      15.70     35.30      6.70     42.00     -0.00      -0.00       -0.00
    72      1150.00       -0.00         212.30      3.46      26.30     31.60      7.60     39.20     -0.00      -0.00       -0.00
    48      1155.00       -0.00         216.90      3.49      24.20     30.20      8.50     38.80     -0.00      -0.00       -0.00
    24      1160.00       -0.00         216.00      3.50      24.20     30.50      8.10     38.60     -0.00      -0.00       -0.00
     0      1160.00       -0.00         235.10      3.40      25.60     29.30      9.00     38.30     -0.00      -0.00       -0.00

   POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
   RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    96       10.50      0.48     -0.00    3020.00    -0.00      3.69      2.71      0.12     -0.00     779.16    -0.00      0.95
    72       11.80      0.84     -0.00    3020.00    -0.00      3.58      2.88      0.20     -0.00     736.88    -0.00      0.87
    48       11.95      0.76     -0.00    3020.00    -0.00      3.51      2.92      0.19     -0.00     736.88    -0.00      0.86
    24       11.87      0.76     -0.00    3020.00    -0.00      3.49      2.87      0.18     -0.00     730.94    -0.00      0.84
     0       13.32      0.83     -0.00    3020.00    -0.00      3.57      3.12      0.19     -0.00     706.68    -0.00      0.83

   POWER         CO               CO               THC              NO               NO               NO
  PERCENT                          2                                                  2                X
   RATED    LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR
   SHP

    96         13.136         3777.388           0.599           -0.000           -0.000            4.617
    72         15.147         3875.601           1.073           -0.000           -0.000            4.592
    48         16.006         4045.375           1.022           -0.000           -0.000            4.700
    24         17.155         4364.539           1.100           -0.000           -0.000            5.039
     0         21.572         4891.250           1.341           -0.000           -0.000            5.777
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DATE:  5/ 3/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:   48    ENGINE TYPE AND MODEL:  GTCP85-98D            SERIAL NUMBER:    P-27692

                                 RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                      0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                        0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                            0. HRS
          N2 COMPRESSOR OVERHAUL:                            0. HRS
          COMBUSTOR CAN REPLACEMENT:                         0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:            0. HRS
          N1 TURBINE OVERHAUL:                               0. HRS
          N2 TURBINE OVERHAUL:                               0. HRS

     FUEL: JP-5                 FUEL H/C RATIO:   1.877

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   78.00   FINISH   78.00

     ATMOSPHERIC PRESSURE:              START   28.72   FINISH   28.72

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0026

     RELATIVE HUMIDITY:                    10.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY



     TEST            POWER                 ENGINE              CORRECTED   GAS GEN      F/A        COMPRESSOR       COMPRESSOR     BLEED
     MODE       SHAFT          AIR          SPEED                 FUEL     AIR FLOW     CALC          INLET          DISCHARGE     FLOW
                 HP            HP            RPM                  FLOW     LB/SEC       FROM          TEMP           PRESSURE      LB/MIN
                                       N1            N2          LB/HR                EMISSIONS    DEGREES F          PSIA

     1/ 0        0.0           0.0    41200.00      -0.00       125.50       -0.00     0.007300       92.00           51.90         0.0
     6/ 1       40.40          0.0    41100.00      -0.00       152.00       -0.00     0.008500       74.00           51.40         0.0
    11/ 6       80.60          0.0    41000.00      -0.00       172.40       -0.00     0.010100       74.00           51.70         0.0
    16/11      120.90          0.0    41000.00      -0.00       197.80       -0.00     0.011900       74.00           51.70         0.0
    20/16      141.70          0.0    40900.00      -0.00       232.00       -0.00     0.014100       75.00           51.60         0.0


  POWER    EXHAUST      EXHAUST          CO         CO        THC        NO        NO         NO     ALDEHYDES    SMOKE    PARTICULATES
 PERCENT     GAS          GAS           (WET)        2       (WET)     (WET)        2          X
  RATED     TEMP        PRESSURE        PPMV       (WET)      PPMV      PPMV      (WET)      (WET)
   SHP    DEGREES F       PSIA                   PERCENT V                        PPMV       PPMV

    0       615.00       -0.00         212.90       1.49      53.60       8.10     13.30      21.40     -0.00      -0.00       -0.00
   25       680.00       -0.00         229.40       1.73      49.60      10.10     13.80      23.90     -0.00      -0.00       -0.00
   50       750.00       -0.00         262.30       2.06      43.50      14.40     14.80      29.20     -0.00      -0.00       -0.00
   75       865.00       -0.00         275.00       2.41      33.70      21.90     14.00      35.90     -0.00      -0.00       -0.00
   88       985.00       -0.00         260.80       2.86      16.30      32.40     12.80      45.20     -0.00      -0.00       -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    0       27.85      4.01     -0.00   3070.00     -0.00      4.60      3.50      0.50     -0.00    385.28     -0.00      0.58
   25       25.82      3.19     -0.00   3060.00     -0.00      4.42      3.92      0.48     -0.00    465.12     -0.00      0.67
   50       24.80      2.35     -0.00   3060.00     -0.00      4.54      4.28      0.41     -0.00    527.54     -0.00      0.78
   75       22.16      1.55     -0.00   3050.00     -0.00      4.76      4.38      0.31     -0.00    603.29     -0.00      0.94
   88       17.71      0.63     -0.00   3050.00     -0.00      5.04      4.11      0.15     -0.00    707.60     -0.00      1.17


  POWER          CO                CO               THC               NO                NO                NO
 PERCENT                            2                                                    2                 X
  RATED     LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
   SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
   25         97.144         11512.863           11.998            -0.000            -0.000           16.626
   50         53.053          6545.207            5.033            -0.000            -0.000            9.709
   75         36.258          4989.988            2.542            -0.000            -0.000            7.783
   88         28.993          4993.645            1.033            -0.000            -0.000            8.252
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DATE:   5/ 3/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:   67    ENGINE TYPE AND MODEL:  GTCP85-98D                SERIAL NUMBER:    P-27692

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: JP-5                 FUEL H/C RATIO:   1.877

OPERATIONAL DATA **********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   98.00   FINISH   98.00

     ATMOSPHERIC PRESSURE:              START   28.72   FINISH   28.72

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0026

     RELATIVE HUMIDITY:                        10.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 COMBINATION SHP/BLEED LOADING



   TEST          POWER               ENGINE              CORRECTED   GAS GEN     F/A                       COMPRESSOR     BLEED
   MODE     SHAFT         AIR         SPEED                FUEL      AIR FLOW    CALC      COMPRESSOR      DISCHARGE      FLOW
             HP           HP           RPM                 FLOW      LB/SEC      FROM        INLET         PRESSURE       LB/MIN
                                  N1            N2         LB/HR                 EMISSIONS   TEMP            PSIA
                                                                                             DEGREES F
   22/ 0    81.00        49.01   40700.00      -0.00      277.50      -0.00    0.018600       96.00          52.10        35.72
   19/22    60.00        73.55   40700.00      -0.00      258.00      -0.00    0.018000       96.00          50.70        55.01
   15/19    40.10        98.04   40800.00      -0.00      267.00      -0.00    0.018300       98.00          49.10        75.37
   10/15    40.00        -0.00   40700.00      -0.00      206.00      -0.00    0.018600      100.00          45.10        -0.00
    5/10     0.0         -0.00   40800.00      -0.00      201.00      -0.00    0.017300      100.00          43.80        -0.00

  POWER    EXHAUST     EXHAUST        CO         CO        THC       NO        NO       NO      ALDEHYDES   SMOKE    PARTICULATES
 PERCENT     GAS         GAS        (WET)         2       (WET)     (WET)       2        X
  RATED     TEMP       PRESSURE      PPMV       (WET)      PPMV      PPMV     (WET)    (WET)
   SHP    DEGREES F      PSIA                 PERCENT V                      PPMV     PPMV

   50      1250.00      -0.00       130.70      3.78      1.30      60.90     8.60    69.50     -0.00      -0.00       -0.00
   37      1250.00      -0.00       142.50      3.67      2.10      58.90     9.00    67.90     -0.00      -0.00       -0.00
   25      1250.00      -0.00       146.00      3.74      1.70      56.50     9.70    66.20     -0.00      -0.00       -0.00
   25      1235.00      -0.00       171.40      3.79      0.30      55.20     9.10    64.30     -0.00      -0.00       -0.00
    0      1200.00      -0.00       214.60      3.51      4.70      48.30    11.50    59.80     -0.00      -0.00       -0.00

  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   50        6.68      0.04     -0.00   3040.00     -0.00      5.83
   37        7.52      0.06     -0.00   3040.00     -0.00      5.88      1.85      0.01     -0.00    843.60     -0.00      1.62
   25        7.56      0.05     -0.00   3040.00     -0.00      5.63      1.94      0.02     -0.00    784.32     -0.00      1.52
   25        8.74      0.01     -0.00   3030.00     -0.00      5.39      2.02      0.01     -0.00    811.68     -0.00      1.50
    0       11.81      0.15     -0.00   3040.00     -0.00      5.41      1.80      0.00     -0.00    624.18     -0.00      1.11
                                                                          2.37      0.03     -0.00    611.04     -0.00      1.09

  POWER         CO               CO               THC              NO               NO              NO
 PERCENT                          2                                                  2               X
  RATED    LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR
   SHP

   50         14.251          6488.590          0.079           -0.000           -0.000          12.448
   37         14.523          5872.707          0.124           -0.000           -0.000          11.365
   25         14.608          5875.594          0.099           -0.000           -0.000          10.874
*****HORSFPOWER-HR BASIS NOT CALCULABLE*****
*****HORSFPOWER-HR BASIS NOT CALCULABLE*****
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DATE:   5/ 6/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:   49    ENGINE TYPE AND MODEL:  GTCP85-98D               SERIAL NUMBER:    P-27857

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                 0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       0. HRS
          N2 COMPRESSOR OVERHAUL:                       0. HRS
          COMBUSTOR CAN REPLACEMENT:                    0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                          0. HRS
          N2 TURBINE OVERHAUL:                          0. HRS

     FUEL: JP-5                 FUEL H/C RATIO:   1.877

OPERATIONAL DATA *******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   77.00   FINISH   77.00

     ATMOSPHERIC PRESSURE:              START   28.78   FINISH   28.78

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0061

     RELATIVE HUMIDITY:                   40.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY



     TEST          POWER              ENGINE             CORRECTED  GAS GEN    F/A        COMPRESSOR     COMPRESSOR    BLEED
     MODE     SHAFT         AIR        SPEED               FUEL     AIR FLOW   CALC         INLET        DISCHARGE     FLOW
               HP           HP          RPM                FLOW     LB/SEC     FROM         TEMP         PRESSURE      LB/MIN
                                   N1          N2          LB/HR               EMISSIONS   DEGREES F       PSIA

     1/ 0      0.0          0.0   41100.00    -0.00      112.50     -0.00    0.009600      79.00          57.90         0.0
     6/ 1     39.30         0.0   40950.00    -0.00      137.00     -0.00    0.007900      78.00          56.60         0.0
    11/ 6     77.90         0.0   40850.00    -0.00      159.50     -0.00    0.009400      77.00          56.90         0.0
    16/11    116.70         0.0   40700.00    -0.00      184.50     -0.00    0.010200      77.00          56.50         0.0
    20/16    155.80         0.0   40600.00    -0.00      211.00     -0.00    0.012700      76.00          56.40         0.0


  POWER    EXHAUST     EXHAUST        CO        CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
  PERCENT    GAS         GAS         (WET)       2       (WET)     (WET)       2         X
  RATED     TEMP       PRESSURE      PPMV      (WET)      PPMV      PPMV     (WET)     (WET)
  SHP     DEGREES F      PSIA               PERCENT V                       PPMV      PPMV

     0      540.00      -0.00       182.20     1.96     63.60      3.60     11.80     15.50     -0.00      -0.00       -0.00
    24      605.00      -0.00       246.90     1.61     84.80      7.00     13.50     20.50     -0.00      -0.00       -0.00
    48      670.00      -0.00       289.70     1.90     79.40     10.10     14.50     24.60     -0.00      -0.00       -0.00
    72      745.00      -0.00       355.20     2.05     71.40     13.30     17.00     30.30     -0.00      -0.00       -0.00
    97      870.00      -0.00       334.30     2.57     41.40     20.90     16.50     37.40     -0.00      -0.00       -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

     0      18.19      3.63     -0.00   3070.00     -0.00      2.53      2.05      0.41     -0.00    345.37     -0.00      0.29
    24      29.86      5.86     -0.00   3050.00     -0.00      4.07      4.09      0.80     -0.00    417.85     -0.00      0.56
    48      29.66      4.63     -0.00   3050.00     -0.00      4.12      4.73      0.74     -0.00    486.47     -0.00      0.66
    72      33.48      3.84     -0.00   3040.00     -0.00      4.69      6.19      0.71     -0.00    560.88     -0.00      0.87
    97      25.14      1.76     -0.00   3040.00     -0.00      4.62      5.30      0.37     -0.00    641.44     -0.00      0.97


  POWER         CO                CO                THC                NO                 NO                 NO
  PERCENT                          2                                                       2                  X
  RATED    LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR
  SHP

  *****HORSEPOWER-HR BASIS NOT CALCULABLE*****
    24       104.082        10632.309            20.445             -0.000             -0.000             14.198
    48        60.723         6244.863             9.484             -0.000             -0.000              8.444
    72        52.928         4806.168             6.077             -0.000             -0.000              7.416
    97        34.046         4117.070             2.390             -0.000             -0.000              6.253
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DATE:   5/ 6/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ***************************************************************************************************

    CAL ID NUMBER:   68    ENGINE TYPE AND MODEL:  GTCP85-98D             SERIAL NUMBER:     P-27857

                           RATED SHAFT HORSEPOWER:    160.

    ENGINE TOTAL TIME:                                 0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                       0. HRS
         N2 COMPRESSOR OVERHAUL:                       0. HRS
         COMBUSTOR CAN REPLACEMENT:                    0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
         N1 TURBINE OVERHAUL:                          0. HRS
         N2 TURBINE OVERHAUL:                          0. HRS

    FUEL: JP-5               FUEL H/C RATIO:   1.877

OPERATIONAL DATA **********************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   76.00   FINISH   76.00

    ATMOSPHERIC PRESSURE:              START   28.78   FINISH   28.78

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0061

    RELATIVE HUMIDITY:                    40.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

    SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 COMBINATION SHP/BLEED LOADING
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TEST MODE	POWER SHAFT HP	POWER AIR HP	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	CORRECTED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	F/A CALC FROM EMISSIONS	COMPRESSOR INLET TEMP DEGREES F	COMPRESSOR DISCHARGE PRESSURE PSIA	BLEED FLOW LB/MIN
22/ 0	153.90	88.03	40100.00	-0.00	284.50	-0.00	0.019700	78.00	53.40	64.79
19/22	115.50	106.58	40300.00	-0.00	273.00	-0.00	0.018400	75.00	52.70	79.86
15/19	76.90	125.06	40300.00	-0.00	264.00	-0.00	0.018100	74.00	51.70	95.59
10/15	38.80	139.40	40400.00	-0.00	255.00	-0.00	0.017500	73.00	50.50	109.17
5/10	0.0	150.48	40500.00	-0.00	234.00	-0.00	0.017700	81.00	49.00	119.55

POWER PERCENT RATED SHP	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
96	1230.00	-0.00	138.10	4.00	41.40	60.30	9.00	69.30	-0.00	-0.00	-0.00
72	1195.00	-0.00	201.00	3.73	40.60	56.70	9.60	66.30	-0.00	-0.00	-0.00
48	1185.00	-0.00	212.30	3.68	73.30	50.60	11.90	62.50	-0.00	-0.00	-0.00
24	1175.00	-0.00	240.50	3.56	76.20	47.50	11.70	59.20	-0.00	-0.00	-0.00
0	1170.00	-0.00	202.80	3.59	13.80	42.80	12.80	55.60	-0.00	-0.00	-0.00

POWER PERCENT RATED SHP	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
96	6.64	1.14	-0.00	3030.00	-0.00	5.48	1.89	0.32	-0.00	862.03	-0.00	1.56
72	10.40	1.20	-0.00	3030.00	-0.00	5.64	2.84	0.33	-0.00	827.19	-0.00	1.54
48	11.13	2.20	-0.00	3030.00	-0.00	5.38	2.94	0.58	-0.00	799.92	-0.00	1.42
24	13.04	2.36	-0.00	3030.00	-0.00	5.27	3.33	0.60	-0.00	772.65	-0.00	1.34
0	10.90	0.42	-0.00	3040.00	-0.00	4.91	2.55	0.10	-0.00	711.36	-0.00	1.15

POWER PERCENT RATED SHP	CO LB/1K HP-HR	CO_2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO_2 LB/1K HP-HR	NO_x LB/1K HP-HR
96	7.814	3563.224	1.338	-0.000	-0.000	6.442
72	12.788	3724.758	1.476	-0.000	-0.000	6.933
48	14.546	3960.786	2.872	-0.000	-0.000	7.038
24	18.663	4335.809	3.378	-0.000	-0.000	7.538
0	16.956	4727.387	0.659	-0.000	-0.000	7.631

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DATE:   5/ 1/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:   50    ENGINE TYPE AND MODEL:  GTCP85-98                 SERIAL NUMBER:    P-15454

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                              0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                    0. HRS
          N2 COMPRESSOR OVERHAUL:                    0. HRS
          COMBUSTOR CAN REPLACEMENT:                 0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    0. HRS
          N1 TURBINE OVERHAUL:                       0. HRS
          N2 TURBINE OVERHAUL:                       0. HRS

     FUEL: JP-5                 FUEL H/C RATIO:   1.877

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   88.00   FINISH   88.00

     ATMOSPHERIC PRESSURE:              START   28.65   FINISH   28.65

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0019

     RELATIVE HUMIDITY:                     18.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY


                                                                                                   BLEED
                                                      CORRECTED  GAS GEN     F/A      COMPRESSOR  COMPRESSOR     FLOW
  TEST          POWER             ENGINE                FUEL     AIR FLOW    CALC       INLET     DISCHARGE     LB/MIN
  MODE     SHAFT        AIR        SPEED                FLOW     LB/SEC      FROM       TEMP      PRESSURE
             HP         HP          RPM                 LB/HR              EMISSIONS  DEGREES F     PSIA
                                 N1           N2
                                                                                                   54.20       0.0
   1/ 0      0.0        0.0    41000.00     -0.00     113.00     -0.00    0.006700      85.00      53.90       0.0
   6/ 1     38.30       0.0    40900.00     -0.00     132.00     -0.00    0.008100      85.00      53.60       0.0
  11/ 6     76.40       0.0    40800.00     -0.00     154.00     -0.00    0.009600      88.00      53.10       0.0
  16/11    114.30       0.0    40700.00     -0.00     177.00     -0.00    0.011300      90.00      52.50       0.0
  20/16    151.60       0.0    40500.00     -0.00     208.80     -0.00    0.013800      94.00


                                                                 NO         NO     ALDEHYDES   SHOKE    PARTICULATES
 POWER    EXHAUST     EXHAUST        CO        CO       THC      NO          2          X
PERCENT     GAS         GAS        (WET)        2      (WET)    (WET)      (WET)      (WET)
 RATED      TEMP      PRESSURE      PPMV     (WET)      PPMV     PPMV       PPMV       PPMV
  SHP    DEGREES F      PSIA                PERCENT V
                                                                                  -0.00      -0.00       -0.00
   0       550.00      -0.00       279.20     1.36    112.10     2.50      9.40      11.90    -0.00      -0.00       -0.00
  23       600.00      -0.00       291.90     1.63     81.00     4.90     10.40      15.20    -0.00      -0.00       -0.00
  47       690.00      -0.00       298.00     1.95     51.20     8.50     11.10      19.60    -0.00      -0.00       -0.00
  71       800.00      -0.00       282.50     2.29     30.10    13.60     10.60      24.30    -0.00      -0.00       -0.00
  94       950.00      -0.00       243.50     2.81     10.80    22.50      9.00      31.60


 POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0      39.82      9.14     -0.00    3040.00    -0.00      2.80      4.50      1.03     -0.00     343.52    -0.00      0.32
  23      34.68      5.50     -0.00    3050.00    -0.00      2.98      4.58      0.73     -0.00     402.60    -0.00      0.39
  47      29.71      2.92     -0.00    3050.00    -0.00      3.20      4.58      0.45     -0.00     469.70    -0.00      0.49
  71      23.99      1.46     -0.00    3050.00    -0.30      3.39      4.25      0.26     -0.00     539.85    -0.00      0.60
  94      16.82      0.43     -0.00    3050.00    -0.00      3.58      3.51      0.09     -0.00     636.84    -0.00      0.75


                                                                                    NO
 POWER         CO              CO              THC            NO          NO         X
PERCENT                         2                                          2
 RATED    LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR  LB/1K HP-HR  LB/1K HP-HR
  SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
  23        119.527       10511.742         18.949          -0.000       -0.000       10.257
  47         59.891        6147.902          5.878          -0.000       -0.000        6.458
  71         37.158        4723.094          2.262          -0.000       -0.000        5.245
  94         23.172        4200.789          0.589          -0.000       -0.000        4.932
```

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DATE:  5/ 1/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:   69    ENGINE TYPE AND MODEL:  GTCP85-98                    SERIAL NUMBER:    P-15454

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: JP-5                  FUEL H/C RATIO:   1.877

OPERATIONAL DATA *******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   95.00   FINISH   59.00

     ATMOSPHERIC PRESSURE:              START   28.65   FINISH   28.65

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0019

     RELATIVE HUMIDITY:                     18.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

 NUMBER OF TESTS:   5

 COMMENTS:

  COMBINATION SHP/BLEED LOADING



   TEST           POWER                  ENGINE              CORRECTED   GAS GEN     F/A        COMPRESSOR     COMPRESSOR     BLEED
   MODE      SHAFT           AIR         SPEED                 FUEL     AIR FLOW    CALC          INLET        DISCHARGE      FLOW
              HP             HP           RPM                  FLOW      LB/SEC     FROM          TEMP         PRESSURE      LB/MIN
                                     N1             N2         LB/HR              EMISSIONS    DEGREES F         PSIA

   22/ 0    150.50         67.56   40200.00       -0.00       261.50     -0.00    0.018300        96.00          51.60        49.69
   19/22    113.20         95.10   40300.00       -0.00       251.50     -0.00    0.018200        96.00          50.40        71.53
   15/19     75.50        116.97   40300.00       -0.00       246.50     -0.00    0.017900        95.00          49.40        89.87
   10/15     37.80        133.85   40400.00       -0.00       241.50     -0.00    0.017900        94.00          47.70       106.65
    5/10      0.0         148.43   40400.00       -0.00       231.70     -0.00    0.017600        92.00          46.40       122.05


  POWER    EXHAUST      EXHAUST         CO          CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS          (WET)         2       (WET)     (WET)       2         X
  RATED      TEMP       PRESSURE       PPMV        (WET)      PPMV      PPMV     (WET)     (WET)
   SHP    DEGREES F       PSIA                   PERCENT V                       PPMV      PPMV

   94      1200.00       -0.00        134.00       3.74       2.20     39.20     4.90     44.10     -0.00      -0.00      -0.00
   70      1200.00       -0.00        144.40       3.71       3.30     39.30     5.10     44.40     -0.00      -0.00      -0.00
   47      1200.00       -0.00        170.00       3.64       3.60     37.60     5.90     43.50     -0.00      -0.00      -0.00
   23      1200.00       -0.00        171.80       3.63       3.00     36.40     5.90     42.30     -0.00      -0.00      -0.00
    0      1200.00       -0.00        214.10       3.57       4.30     34.70     7.10     41.70     -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO         HC       NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   94       6.94      0.06     -0.00    3040.00    -0.00      3.75      1.81      0.07     -0.00     794.96    -0.00      0.98
   70       7.53      0.10     -0.00    3040.00    -0.00      3.80      1.90      0.07     -0.00     764.56    -0.00      0.96
   47       9.04      0.11     -0.00    3040.00    -0.00      3.79      2.23      0.03     -0.00     749.36    -0.00      0.93
   23      10.20      0.09     -0.00    3040.00    -0.00      3.70      2.46      0.02     -0.00     734.16    -0.00      0.89
    0      11.59      0.13     -0.00    3040.00    -0.00      3.71      2.69      0.03     -0.00     704.37    -0.00      0.86


  POWER          CO                 CO                THC                NO                 NO                NO
 PERCENT                             2                                                        2                 X
  RATED     LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR
   SHP

   94           8.319           3645.544            0.078             -0.000             -0.000             4.496
   70           9.098           3670.501            0.117             -0.000             -0.000             4.594
   47          11.580           3893.331            0.141             -0.000             -0.000             4.856
   23          14.355           4277.020            0.127             -0.000             -0.000             5.204
    0          18.099           4745.578            0.209             -0.000             -0.000             5.796
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DATE:   5/18/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:   51    ENGINE TYPE AND MODEL:  GTCP85-98                 SERIAL NUMBER:    P-15257

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: AV KEROS              FUEL H/C RATIO:   1.928

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   86.00   FINISH   86.00

     ATMOSPHERIC PRESSURE:              START   28.84   FINISH   28.84

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0013

     RELATIVE HUMIDITY:                    8.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY




    TEST           POWER                ENGINE              CORRECTED   GAS GEN     F/A        COMPRESSOR      COMPRESSOR    BLEED
    MODE       SHAFT          AIR        SPEED                 FUEL     AIR FLOW    CALC         INLET          DISCHARGE    FLOW
                HP            HP          RPM                  FLOW     LB/SEC      FROM         TEMP           PRESSURE     LB/MIN
                                      N1           N2          LB/HR               EMISSIONS   DEGREES F          PSIA

    1/ 0        0.0           0.0   41000.00      -0.00      116.80      -0.00     0.007300      84.00           54.90        0.0
    6/ 1       38.30          0.0   40900.00      -0.00      136.50      -0.00     0.008500      84.00           55.20        0.0
   11/ 6       76.40          0.0   40800.00      -0.00      158.80      -0.00     0.010000      85.00           54.90        0.0
   16/11      114.30          0.0   40700.00      -0.00      182.00      -0.00     0.011700      85.00           54.60        0.0
   20/16      152.00          0.0   40600.00      -0.00      219.50      -0.00     0.013700      90.90           54.00        0.0


  POWER    EXHAUST     EXHAUST         CO         CO        THC        NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
 PERCENT     GAS         GAS          (WET)        2       (WET)     (WET)        2         X
  RATED     TEMP       PRESSURE       PPMV      (WET)      PPMV      PPMV      (WET)     (WET)
  SHP     DEGREES F      PSIA                  PERCENT V                       PPMV      PPMV

    0       530.00      -0.00        288.60      1.47     158.90      7.10     12.80     19.90    -0.00      -0.00        -0.00
   23       610.00      -0.00        269.10      1.71      89.30      9.30     17.00     26.40    -0.00      -0.00        -0.00
   47       695.00      -0.00        263.50      2.02      37.30     18.70     14.10     32.80    -0.00      -0.00        -0.00
   71       785.00      -0.00        253.80      2.37      16.80     26.80     13.50     40.20    -0.00      -0.00        -0.00
   94       910.00      -0.00        219.10      2.78       3.30     36.70     12.20     48.90    -0.00      -0.00        -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    0       37.73     11.88     -0.00   3020.00     -0.00      4.27      4.41      1.39     -0.00    352.74     -0.00      0.50
   23       30.50      5.79     -0.00   3040.00     -0.00      4.91      4.16      0.79     -0.00    414.96     -0.00      0.67
   47       25.27      2.04     -0.00   3050.00     -0.00      5.16      4.01      0.32     -0.00    484.34     -0.00      0.82
   71       20.76      0.79     -0.00   3040.00     -0.00      5.40      3.78      0.14     -0.00    553.28     -0.00      0.98
   94       15.27      0.13     -0.00   3040.00     -0.00      5.60      3.35      0.03     -0.00    667.28     -0.00      1.23


  POWER        CO               CO               THC               NO               NO               NO
 PERCENT                         2                                                   2                X
  RATED    LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR
  SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
   23        108.708        10834.461          20.621           -0.000           -0.000           17.492
   47         52.525         6339.523           4.249           -0.000           -0.000           10.731
   71         33.050         4840.594           1.253           -0.000           -0.000            8.606
   94         22.057         4389.996           0.189           -0.000           -0.000            8.088
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DATE:   5/18/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:   70    ENGINE TYPE AND MODEL:  GTCP85-98                    SERIAL NUMBER:    P-15257

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                     0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                       0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                           0. HRS
          N2 COMPRESSOR OVERHAUL:                           0. HRS
          COMBUSTOR CAN REPLACEMENT:                        0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:           0. HRS
          N1 TURBINE OVERHAUL:                              0. HRS
          N2 TURBINE OVERHAUL:                              0. HRS

     FUEL: AV KEROS              FUEL H/C RATIO:   1.928

OPERATIONAL DATA *******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   87.00   FINISH   87.00

     ATMOSPHERIC PRESSURE:              START   28.84   FINISH   28.84

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0013

     RELATIVE HUMIDITY:                      8.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 COMBINATION SHP/BLEED LOADING



    TEST            POWER              ENGINE               CORRECTED   GAS GEN      F/A       COMPRESSOR      COMPRESSOR     BLEED
    MODE      SHAFT          AIR        SPEED                  FUEL     AIR FLOW     CALC        INLET         DISCHARGE      FLOW
               HP            HP          RPM                   FLOW     LB/SEC       FROM        TEMP          PRESSURE       LB/MIN
                                    N1            N2           LB/HR              EMISSIONS    DEGREES F         PSIA

   22/ 0     151.30        62.92  40400.00      -0.00         270.00     -0.00    0.018400       85.00          53.50         45.64
   19/22     113.50        95.29  40400.00      -0.00         270.00     -0.00    0.019000       86.00          52.00         70.85
   15/19      75.60        63.42  40400.00      -0.00         274.00     -0.00    0.018600       88.00          53.20         45.99
   10/15      37.90       109.73  40500.00      -0.00         262.00     -0.00    0.019100       88.00          50.60         83.42
    5/10       0.0        146.13  40560.00      -0.00         242.00     -0.00    0.018900       88.00          48.20        116.49

  POWER    EXHAUST     EXHAUST         CO          CO         THC        NO        NO        NO      ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS          (WET)         2        (WET)     (WET)        2         X
  RATED     TEMP       PRESSURE       PPMV       (WET)       PPMV      PPMV      (WET)     (WET)
   SHP    DEGREES F      PSIA                   PERCENT V                        PPMV      PPMV

    94     1200.00      -0.00        120.80      3.74        2.70      59.90      5.40      65.30     -0.00      -0.00      -0.00
    70     1200.00      -0.00        122.70      3.85        0.70      58.00      5.40      63.40     -0.00      -0.00      -0.00
    47     1200.00      -0.00        125.50      3.78        1.10      60.10      6.30      66.40     -0.00      -0.00      -0.00
    23     1200.00      -0.00        117.00      3.87        0.60      59.30      5.40      64.60     -0.00      -0.00      -0.00
     0     1200.00      -0.00        137.70      3.83        0.80      54.20      5.00      59.30     -0.00      -0.00      -0.00

  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2        NO        NOX
  RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K      LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    94      6.22      0.08     -0.00    3030.00    -0.00      5.52      1.68      0.02     -0.00     818.10     -0.00      1.49
    70      6.13      0.02     -0.00    3020.00    -0.00      5.20      1.66      0.01     -0.00     815.40     -0.00      1.41
    47      5.88      0.03     -0.00    3020.00    -0.00      5.55      1.61      0.01     -0.00     827.49     -0.00      1.52
    23      5.82      0.02     -0.00    3020.00    -0.00      5.28      1.53      0.00     -0.00     791.24     -0.00      1.38
     0      6.92      0.02     -0.00    3020.00    -0.00      4.89      1.67      0.01     -0.00     730.84     -0.00      1.18

  POWER         CO                 CO                 THC                 NO                 NO                 NO
 PERCENT                            2                                                          2                  X
  RATED     LB/1K HP-HR       LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR
   SHP

    94         7.836           3818.908             0.098             -0.000             -0.000              6.953
    70         7.927           3905.268             0.027             -0.000             -0.000              6.729
    47        11.585           5952.082             0.061             -0.000             -0.000             10.942
    23        10.331           5359.711             0.032             -0.000             -0.000              9.378
     0        11.457           5001.332             0.039             -0.000             -0.000              8.098
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DATE:   5/21/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ***************************************************************************************************************

     CAL ID NUMBER:   52     ENGINE TYPE AND MODEL:  GTCP85-98                SERIAL NUMBER:     P-15541

                             RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                 0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       0. HRS
          N2 COMPRESSOR OVERHAUL:                       0. HRS
          COMBUSTOR CAN REPLACEMENT:                    0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                          0. HRS
          N2 TURBINE OVERHAUL:                          0. HRS

     FUEL: AV KEROS               FUEL H/C RATIO:   1.928

OPERATIONAL DATA **********************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    93.00    FINISH    93.00

     ATMOSPHERIC PRESSURE:              START    28.58    FINISH    28.58

     INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0033

     RELATIVE HUMIDITY:                      13.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:    -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY



     TEST           POWER                  ENGINE              CORRECTED  GAS GEN    F/A        COMPRESSOR     COMPRESSOR    BLEED
     MODE     SHAFT         AIR             SPEED                FUEL     AIR FLOW   CALC         INLET        DISCHARGE     FLOW
               HP           HP               RPM                 FLOW     LB/SEC     FROM         TEMP         PRESSURE      LB/MIN
                                         N1          N2          LB/HR               EMISSIONS    DEGREES F      PSIA

     1/ 0      0.0          0.0      41000.00      -0.00       117.00     -0.00     0.007000       88.00         51.90        0.0
     6/ 1     38.10         0.0      40700.00      -0.00       125.00     -0.00     0.008400       92.00         51.40        0.0
    11/ 6     76.00         0.0      40600.00      -0.00       158.00     -0.00     0.009900       95.00         51.30        0.0
    16/11    113.50         0.0      40400.00      -0.00       182.00     -0.00     0.012000       96.00         51.20        0.0
    20/16    150.90         0.0      40300.00      -0.00       213.40     -0.00     0.014500       95.00         51.00        0.0

 POWER    EXHAUST      EXHAUST        CO          CO         THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS          GAS         (WET)         2        (WET)     (WET)       2         X
 RATED     TEMP       PRESSURE       PPMV       (WET)       PPMV      PPMV     (WET)     (WET)
  SHP    DEGREES F      PSIA                  PERCENT V                        PPMV      PPMV

   0      550.00       -0.00        282.10       1.38      222.10      8.20     13.10     18.30     -0.00      -0.00      -0.00
  23      635.00       -0.00        319.90       1.68      169.80      9.20     15.00     24.20     -0.00      -0.00      -0.00
  47      740.00       -0.00        329.00       1.99      121.90     14.70     15.30     30.00     -0.00      -0.00      -0.00
  70      865.00       -0.00        296.40       2.42       73.60     23.90     13.80     37.70     -0.00      -0.00      -0.00
  94      995.00       -0.00        196.10       2.93       54.10     40.40      7.70     48.10     -0.00      -0.00      -0.00

 POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT     CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2        NO        NOX
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0      39.00     17.55     -0.00    3000.00    -0.00      4.15      4.56      2.05     -0.00     351.00     -0.00      0.49
  23      36.52     11.08     -0.00    3010.00    -0.00      4.54      4.56      1.38     -0.00     376.25     -0.00      0.57
  47      31.77      6.75     -0.00    3020.00    -0.00      4.78      5.02      1.07     -0.00     477.16     -0.00      0.75
  70      23.60      3.35     -0.00    3030.00    -0.00      4.93      4.30      0.61     -0.00     551.46     -0.00      0.90
  94      12.91      2.04     -0.00    3040.00    -0.00      5.20      2.76      0.43     -0.00     648.74     -0.00      1.11

 POWER        CO               CO              THC               NO               NO               NO
PERCENT                         2                                                   2                X
 RATED    LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR
  SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
  23        119.803        9875.316         36.348           -0.000           -0.000           14.905
  47         66.056        6278.418         14.027           -0.000           -0.000            9.929
  70         37.848        4858.676          5.372           -0.000           -0.000            7.907
  94         18.264        4299.109          2.882           -0.000           -0.000            7.354
```

DATE: 5/21/71

TEST ORGANIZATION: AIRESEARCH

ENGINE SUPPLIER: AIRESEARCH

ENGINE DATA **

CAL ID NUMBER: 71 ENGINE TYPE AND MODEL: GTCP85-98 SERIAL NUMBER: P-15541

RATED SHAFT HORSEPOWER: 160.

ENGINE TOTAL TIME: 0. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	0. HRS
N2 COMPRESSOR OVERHAUL:	0. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	0. HRS
N1 TURBINE OVERHAUL:	0. HRS
N2 TURBINE OVERHAUL:	0. HRS

FUEL: AV KEROS FUEL H/C RATIO: 1.928

OPERATIONAL DATA **

INLFT AIR TEMPERATURE, DEGREES F: START 97.00 FINISH 97.00

ATMOSPHERIC PRESSURE: START 28.58 FINISH 28.58

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0033

RELATIVE HUMIDITY: 13.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: -0.00

SAMPLE LINE TRANSPORT TIME, SEC: -0.00

NUMBER OF TESTS: 5

COMMENTS:

COMBINATION SHP/BLEED LOADING

TEST MODE	POWER SHAFT HP	POWER AIR HP	ENGINE SPFED RPM N1	ENGINE SPFED RPM N2	CORRFCTED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	F/A CALC FROM EMISSIONS	COMPRESSOR INLET TEMP DEGREFS F	COMPRESSOR DISCHARGF PRESSURF PSIA	BLEED FLOW LB/MIN
22/ 0	149.80	52.05	40000.00	-0.00	258.30	-0.00	0.019500	96.00	49.00	40.24
19/22	112.10	83.87	39900.00	-0.00	253.40	-0.00	0.019500	98.00	48.00	65.93
15/19	74.70	104.11	39900.00	-0.00	248.40	-0.00	0.019500	98.00	46.90	83.77
10/15	37.40	122.03	40000.00	-0.00	243.40	-0.00	0.019200	97.00	45.70	101.01
5/10	0.0	134.53	40000.00	-0.00	233.40	-0.00	0.019100	96.00	44.00	116.07

POWER PERCENT RATED SHP	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO2 (WET) PPMV	NOX (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
93	1250.00	-0.00	90.10	3.96	45.20	61.10	4.90	66.00	-0.00	-0.00	-0.00
70	1250.00	-0.00	100.90	3.95	68.30	61.30	5.10	66.40	-0.00	-0.00	-0.00
46	1250.00	-0.00	109.20	3.94	57.60	59.80	4.60	64.40	-0.00	-0.00	-0.00
23	1250.00	-0.00	114.50	3.89	80.10	59.60	4.10	63.70	-0.00	-0.00	-0.00
0	1250.00	-0.00	127.60	3.86	56.60	56.30	4.60	60.90	-0.00	-0.00	-0.00

POWER PERCENT RATED SHP	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
93	4.37	1.25	-0.00	3020.00	-0.00	5.26	1.13	0.32	-0.00	780.06	-0.00	1.36
70	4.90	1.90	-0.00	3020.00	-0.00	5.30	1.24	0.48	-0.00	765.27	-0.00	1.34
46	5.32	1.60	-0.00	3020.00	-0.00	5.15	1.32	0.40	-0.00	750.17	-0.00	1.28
23	5.65	2.26	-0.00	3020.00	-0.00	5.16	1.37	0.55	-0.00	735.07	-0.00	1.26
0	6.35	1.61	-0.00	3020.00	-0.00	4.99	1.48	0.38	-0.00	704.87	-0.00	1.16

POWER PERCENT RATED SHP	CO LB/1K HP-HR	CO2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO2 LB/1K HP-HR	NOX LB/1K HP-HR
93	5.593	3864.502	1.606	-0.000	-0.000	6.732
70	6.333	3905.093	2.453	-0.000	-0.000	6.851
46	7.385	4195.363	2.228	-0.000	-0.000	7.156
23	8.619	4610.492	3.446	-0.000	-0.000	7.876
0	11.022	5239.453	2.791	-0.000	-0.000	8.652

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DATE:   5/13/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ******************************************************************************************

     CAL ID NUMBER:   53    ENGINE TYPE AND MODEL:  GTCP85-115              SERIAL NUMBER:    P-18725

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                      0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                        0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                            0. HRS
          N2 COMPRESSOR OVERHAUL:                            0. HRS
          COMBUSTOR CAN REPLACEMENT:                         0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:            0. HRS
          N1 TURBINE OVERHAUL:                               0. HRS
          N2 TURBINE OVERHAUL:                               0. HRS

     FUEL: JP-5                  FUEL H/C RATIO:   1.877

OPERATIONAL DATA *************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   92.00   FINISH   92.00

     ATMOSPHERIC PRESSURE:              START   28.78   FINISH   28.78

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0059

     RELATIVE HUMIDITY:                    25.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY




   TEST           POWER             ENGINE           CORRECTED   GAS GEN     F/A        COMPRESSOR     COMPRESSOR   BLEED
   MODE     SHAFT        AIR         SPEED              FUEL     AIR FLOW    CALC         INLET        DISCHARGE    FLOW
             HP          HP           RPM               FLOW     LB/SEC      FROM         TEMP         PRESSURE     LB/MIN
                                   N1          N2       LB/HR                EMISSIONS   DEGREES F       PSIA

   1/ 0      0.0         0.0    41100.00     -0.00     110.60     -0.00     0.006400      82.00          64.10       0.0
   6/ 1     38.20        0.0    40800.00     -0.00     121.70     -0.00     0.007700      85.00          62.90       0.0
  11/ 6     76.00        0.0    40600.00     -0.00     155.90     -0.00     0.009700      93.00          61.00       0.0
  16/11    113.70        0.0    40500.00     -0.00     185.30     -0.00     0.012400     105.00          58.10       0.0
  20/16    151.30        0.0    40400.00     -0.00     215.80     -0.00     0.014000      96.00          61.90       0.0


 POWER    EXHAUST     EXHAUST        CO        CO        THC        NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS         GAS        (WET)       2        (WET)     (WET)       2         X
 RATED     TEMP      PRESSURE      PPMV     (WET)       PPMV      PPMV     (WET)     (WET)
  SHP    DEGREES F     PSIA                PERCENT V                        PPMV      PPMV

   0      520.00      -0.00       196.10     1.30      58.20       5.40    10.80     16.10     -0.00      -0.00      -0.00
  23      615.00      -0.00       215.90     1.56      54.70       8.70    11.90     20.50     -0.00      -0.00      -0.00
  47      740.00      -0.00       211.40     1.98      27.00      19.50     9.50     29.10     -0.00      -0.00      -0.00
  71      900.00      -0.00       221.10     2.52      13.30      32.00     8.70     40.70     -0.00      -0.00      -0.00
  94     1010.00      -0.00       217.20     2.86       6.90      39.80     4.70     44.50     -0.00      -0.00      -0.00


 POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0      29.42      4.99     -0.00    3070.00    -0.00      3.97      3.25      0.55     -0.00     339.54    -0.00      0.44
  23      27.00      3.91     -0.00    3070.00    -0.00      4.22      3.29      0.48     -0.00     373.62    -0.00      0.51
  47      20.82      1.52     -0.00    3070.00    -0.00      4.70      3.25      0.24     -0.00     478.61    -0.00      0.73
  71      17.07      0.59     -0.00    3060.00    -0.00      5.16      3.16      0.11     -0.00     567.02    -0.00      0.96
  94      14.79      0.27     -0.00    3050.00    -0.00      4.98      3.19      0.06     -0.00     658.19    -0.00      1.07


 POWER        CO                CO               THC                NO                NO                NO
PERCENT                          2                                                     2                 X
 RATED    LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
  SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
  23        86.015          9780.594          12.447            -0.000            -0.000            13.444
  47        42.704          6297.535           3.114            -0.000            -0.000             9.649
  71        27.824          4986.961           0.957            -0.000            -0.000             8.411
  94        21.089          4350.227           0.382            -0.000            -0.000             7.103
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DATE:   5/13/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ******************************************************************************************

     CAL ID NUMBER:   72    ENGINE TYPE AND MODEL:  GTCP85-115          SERIAL NUMBER:    P-18725

                              RATED SHAFT HORSEPOWER:    160.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL:  JP-5                FUEL H/C RATIO:    1.877

OPERATIONAL DATA ******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START  107.00   FINISH  107.00

     ATMOSPHERIC PRESSURE:              START   28.78   FINISH   28.78

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0059

     RELATIVE HUMIDITY:                 25.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 COMBINATION SHP/BLEED LOADING



   TEST              POWER                 ENGINE              CORRECTED   GAS GEN     F/A        COMPRESSOR      COMPRESSOR     BLEED
   MODE      SHAFT            AIR          SPEED                 FUEL      AIR FLOW    CALC         INLET         DISCHARGE      FLOW
              HP              HP            RPM                  FLOW      LB/SEC      FROM         TEMP          PRESSURE       LB/MIN
                                      N1            N2           LB/HR                EMISSIONS   DEGREES F         PSIA

  22/ 0    150.90           49.73   40300.00      -0.00        254.50      -0.00     0.017600      102.00          56.90         33.08
  19/22    113.20           71.74   40300.00      -0.00        246.40      -0.00     0.017400      102.00          54.20         49.86
  15/19     75.60           93.73   40400.00      -0.00        234.20      -0.00     0.016900      114.00          52.60         65.58
  10/15     37.80          116.13   40400.00      -0.00        233.20      -0.00     0.017400      109.00          50.60         85.03
   5/10      0.0             0.0        0.0       -0.00         -0.00      -0.00     0.017200       -0.00          -0.00          0.0

 POWER    EXHAUST      EXHAUST           CO         CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS          GAS            (WET)        2       (WET)     (WET)       2         X
 RATED      TEMP       PRESSURE         PPMV      (WET)      PPMV      PPMV      (WET)     (WET)
  SHP    DEGREES F       PSIA                   PERCENT V                         PPMV      PPMV

  94      1200.00       -0.00          161.80      3.58      3.00     48.50      5.70     54.10     -0.00      -0.00      -0.00
  70      1200.00       -0.00          200.40      3.54      3.30     49.90      5.60     55.50     -0.00      -0.00      -0.00
  47      1195.00       -0.00          226.70      3.43      4.40     46.60      5.80     52.40     -0.00      -0.00      -0.00
  23      1200.00       -0.00          243.10      3.54      5.00     48.40      6.70     55.10     -0.00      -0.00      -0.00
   0         0.0        -0.00          264.30      3.48      8.00     45.10      7.50     52.60     -0.00      -0.00      -0.00

 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  94        8.74      0.09     -0.00    3040.00    -0.00      4.80      2.22      0.02     -0.00     773.68    -0.00      1.22
  70       10.95      0.10     -0.00    3040.00    -0.00      4.98      2.70      0.03     -0.00     749.06    -0.00      1.23
  47       12.80      0.14     -0.00    3040.00    -0.00      4.86      3.00      0.03     -0.00     711.97    -0.00      1.14
  23       13.26      0.16     -0.00    3030.00    -0.00      4.93      3.09      0.04     -0.00     706.60    -0.00      1.15
   0       14.65      0.25     -0.00    3030.00    -0.00      4.79     -0.00     -0.00     -0.00      -0.00    -0.00     -0.00

 POWER          CO                CO               THC               NO                NO                NO
PERCENT                            2                                                    2                 X
 RATED     LB/1K HP-HR      LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
  SHP

  94          11.085          3856.163           0.113            -0.000            -0.000             6.092
  70          14.594          4050.263           0.139            -0.000            -0.000             6.638
  47          17.700          4204.504           0.198            -0.000            -0.000             6.722
  23          20.084          4590.340           0.236            -0.000            -0.000             7.475
*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
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DATE:   6/ 8/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************************

     CAL ID NUMBER:   54    ENGINE TYPE AND MODEL:  GTCP85-115             SERIAL NUMBER:    P-18781

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS_

     TiME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: AV KEROS             FUEL H/C RATIO:   1.928

OPERATIONAL DATA ***********************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   93.00   FINISH   95.00

     ATMOSPHERIC PRESSURE:              START   28.72   FINISH   28.72

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0046

     RELATIVE HUMIDITY:                   15.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY



     TEST          POWER            ENGINE          CORRECTED   GAS GEN     F/A        COMPRESSOR    COMPRESSOR    BLEED
     MODE     SHAFT        AIR        SPEED            FUEL     AIR FLOW    CALC         INLET       DISCHARGE     FLOW
               HP          HP          RPM             FLOW     LB/SEC      FROM         TEMP        PRESSURE      LB/MIN
                                   N1         N2      LB/HR              EMISSIONS    DEGREES F       PSIA

     1/ 0      0.0         0.0   41200.00    -0.00    121.60     -0.00   0.006600       92.00         53.50         0.0
     6/ 1     38.60        0.0   41200.00    -0.00    139.00     -0.00   0.008300       91.00         54.40         0.0
    11/ 6     77.10        0.0   41200.00    -0.00    161.00     -0.00   0.010000       91.00         54.40         0.0
    16/11    115.10        0.0   41000.00    -0.00    186.20     -0.00   0.011800       94.00         54.10         0.0
    20/16    153.10        0.0   40900.00    -0.00    216.50     -0.00   0.013600       96.00         53.90         0.0


   POWER    EXHAUST     EXHAUST        CO         CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
  PERCENT     GAS         GAS        (WET)        2        (WET)     (WET)      2         X
   RATED     TEMP       PRESSURE      PPMV      (WET)       PPMV      PPMV     (WET)     (WET)
    SHP    DEGREES F      PSIA                 PERCENT V                       PPMV      PPMV

     0      545.00       -0.00      194.60       1.33      62.00      3.70      7.50     11.10     -0.00      -0.00      -0.00
    24      620.00       -0.00      221.20       1.68       6.45      5.80      8.90     14.70     -0.00      -0.00      -0.00
    48      710.00       -0.00      254.70       2.03      53.80     10.60     11.40     22.00     -0.00      -0.00      -0.00
    71      820.00       -0.00      275.20       2.38      38.50     14.70     10.80     25.40     -0.00      -0.00      -0.00
    95      960.00       -0.00      259.50       2.76      22.70     22.80      9.50     32.30     -0.00      -0.00      -0.00


   POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
   RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUFL

     0      28.33      5.16     -0.00   3050.00     -0.00      2.66      3.44      0.63     -0.00    370.88     -0.00      0.32
    24      25.51      4.25     -0.00   3050.00     -0.00      2.79      3.55      0.59     -0.00    423.95     -0.00      0.39
    48      24.30      2.93     -0.00   3040.00     -0.00      3.44      3.91      0.47     -0.00    489.44     -0.00      0.55
    71      22.38      1.79     -0.00   3040.00     -0.00      3.40      4.17      0.33     -0.00    566.05     -0.00      0.63
    95      18.15      0.91     -0.00   3040.00     -0.00      3.71      3.93      0.20     -0.00    658.16     -0.00      0.80


   POWER         CO                 CO                THC                NO                NO                NO
  PERCENT                            2                                                      2                 X
   RATED    LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR
   SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
    24         91.870          10983.148            15.319             -0.000             -0.000            10.036
    48         50.735           6349.113             6.127             -0.000             -0.000             7.188
    71         36.213           4917.875             2.899             -0.000             -0.000             5.500
    95         25.662           4298.887             1.281             -0.000             -0.000             5.246
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DATE:   6/ 8/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:   73    ENGINE TYPE AND MODEL:  GTCP85-115             SERIAL NUMBER:    P-18781

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: AV KEROS              FUEL H/C RATIO:   1.928

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START  107.00   FINISH  107.00

     ATMOSPHERIC PRESSURE:              START   28.72   FINISH   28.72

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0046

     RELATIVE HUMIDITY:                      15.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 COMBINATION SHP/BLEED LOADING




  TEST            POWER                ENGINE              CORRECTED   GAS GEN     F/A       COMPRESSOR      COMPRESSOR     BLEED
  MODE       SHAFT          AIR         SPEED                FUEL      AIR FLOW    CALC        INLET         DISCHARGE      FLOW
              HP            HP           RPM                 FLOW      LB/SEC      FROM        TEMP          PRESSURE       LB/MIN
                                    N1           N2          LB/HR                EMISSIONS  DEGREES F         PSIA

 22/ 0      152.40         61.69   40700.00     -0.00       281.50      -0.00    0.018300     100.00           51.90        44.80
 19/22      114.30         80.08   40700.00     -0.00       266.50      -0.00    0.018000     110.00           50.20        58.98
 15/19       76.20        104.53   40700.00     -0.00       256.50      -0.00    0.017900     108.00           48.70        79.58
 10/15       38.20        121.75   40800.00     -0.00       251.50      -0.00    0.017800     108.00           47.00        96.03
  5/10        0.0         136.45   40800.00     -0.00       241.50      -0.00    0.017700     108.00           45.30       111.77


 POWER    EXHAUST     EXHAUST          CO         CO         THC        NO        NO         NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS         GAS          (WET)         2        (WET)     (WET)        2          X
 RATED     TEMP       PRESSURE        PPMV       (WET)       PPMV      PPMV      (WET)      (WET)
  SHP    DEGREES F      PSIA                   PERCENT V                          PPMV       PPMV

  95      1250.00      -0.00         144.80       3.72        5.30     37.50      4.90      42.40     -0.00      -0.00      -0.00
  71      1250.00      -0.00         164.60       3.65       12.80     37.00      5.20      42.30     -0.00      -0.00      -0.00
  47      1250.00      -0.00         181.50       3.63       14.30     35.30      6.70      41.90     -0.00      -0.00      -0.00
  23      1250.00      -0.00         213.70       3.61       19.00     34.90      6.70      41.60     -0.00      -0.00      -0.00
   0      1250.00      -0.00         261.00       3.58       23.20     32.00      8.10      40.10     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  95        7.49      0.16     -0.00   3020.00     -0.00      3.60      2.11      0.04     -0.00    850.13     -0.00      1.01
  71        8.69      0.39     -0.00   3020.00     -0.00      3.67      2.32      0.10     -0.00    804.83     -0.00      0.98
  47        9.61      0.43     -0.00   3020.00     -0.00      3.65      2.47      0.11     -0.00    774.63     -0.00      0.94
  23       11.38      0.58     -0.00   3020.00     -0.00      3.64      2.86      0.15     -0.00    759.53     -0.00      0.91
   0       13.99      0.71     -0.00   3020.00     -0.00      3.53      3.38      0.17     -0.00    729.33     -0.00      0.85


 POWER         CO                CO               THC                NO                NO                NO
PERCENT                           2                                                     2                 X
 RATED    LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
 SHP

  95          9.850          3970.900             0.205            -0.000            -0.000             4.736
  71         11.910          4140.488             0.531            -0.000            -0.000             5.026
  47         13.644          4286.059             0.613            -0.000            -0.000             5.177
  23         17.892          4748.660             0.907            -0.000            -0.000             5.717
   0         24.753          5344.934             1.260            -0.000            -0.000             6.249
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DATE:   6/11/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:   55    ENGINE TYPE AND MODEL:  GTCP85-115             SERIAL NUMBER:    P-18702

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                      0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                        0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                            0. HRS
          N2 COMPRESSOR OVERHAUL:                            0. HRS
          COMBUSTOR CAN REPLACEMENT:                         0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:            0. HRS
          N1 TURBINE OVERHAUL:                               0. HRS
          N2 TURBINE OVERHAUL:                               0. HRS

     FUEL: JP-4                 FUEL H/C RATIO:   1.990

OPERATIONAL DATA *************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   94.00   FINISH   94.00

     ATMOSPHERIC PRESSURE:              START   28.00   FINISH   28.00

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0045

     RELATIVE HUMIDITY:                  [illegible].00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY



   TEST          POWER                   ENGINE               CORRECTED   GAS GEN     F/A        COMPRESSOR      COMPRESSOR    BLEED
   MODE      SHAFT          AIR           SPEED                  FUEL     AIR FLOW    CALC         INLET         DISCHARGE     FLOW
              HP            HP             RPM                   FLOW     LB/SEC      FROM         TEMP          PRESSURE      LB/MIN
                                       N1           N2          LB/HR              EMISSIONS    DEGREES F         PSIA

   1/ 0      0.0           0.0     41200.00      -0.00       116.40       -0.00    0.006800       87.00          53.50         0.0
   6/ 1     38.60          0.0     41200.00      -0.00       138.00  [illegible]   0.007900       90.00          53.30         0.0
  11/ 6     76.90          0.0     41100.00      -0.00       158.00  [illegible]   0.009600       94.00          53.00         0.0
  16/11    115.10          0.0     41000.00      -0.00       183.20  [illegible]   0.011700       98.00          52.60         0.0
  20/16    153.50          0.0     41000.00      -0.00       212.00  [illegible]   0.013300      103.00          52.30         0.0


 POWER     EXHAUST       EXHAUST          CO          CO         THC        NO         NO         NO     ALDEHYDES    SMOKE    PARTICULATES
PERCENT      GAS           GAS          (WET)          2        (WET)     (WET)         2          X
 RATED      TEMP        PRESSURE        PPMV        (WET)       PPMV      PPMV       (WET)      (WET)
  SHP     DEGREES F       PSIA                    PERCENT V                          PPMV       PPMV

   0       560.00        -0.00         195.00       1.37       55.80       7.70       7.80      15.50     -0.00       -0.00        -0.00
  24       620.00        -0.00         235.40       1.60       54.90      10.80       9.80      20.60     -0.00       -0.00        -0.00
  48       705.00        -0.00         279.10       1.93       48.10      18.20       8.00      26.20     -0.00       -0.00        -0.00
  71       830.00        -0.00         301.60       2.35       31.20      27.00       6.80      33.80     -0.00       -0.00        -0.00
  95       955.00        -0.00         259.30       2.69       18.30      35.30       6.60      41.90     -0.00       -0.00        -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0       27.47      4.49     -0.00   3040.00     -0.00      3.59      3.20      0.52     -0.00    353.86     -0.00      0.42
  24       28.44      3.79     -0.00   3030.00     -0.00      4.10      3.92      0.52     -0.00    418.14     -0.00      0.57
  48       27.84      2.74     -0.00   3030.00     -0.00      4.30      4.40      0.43     -0.00    478.74     -0.00      0.68
  71       24.65      1.46     -0.00   3020.00     -0.00      4.53      4.52      0.27     -0.00    553.26     -0.00      0.83
  95       18.57      0.75     -0.00   3020.00     -0.00      4.93      3.94      0.16     -0.00    640.24     -0.00      1.05


 POWER         CO                CO               THC                NO                NO                NO
PERCENT                           2                                                     2                 X
 RATED    LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
  SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
  24       101.684         10832.637            13.557            -0.000            -0.000            14.644
  48        57.209          6225.484             5.630            -0.000            -0.000             8.835
  71        39.236          4806.809             2.319            -0.000            -0.000             7.218
  95        25.646          4170.941             1.034            -0.000            -0.000             6.814
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DATE:   6/11/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:   74    ENGINE TYPE AND MODEL:  GTCP85-115              SERIAL NUMBER:    P-18702

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: JP-4                 FUEL H/C RATIO:   1.990

OPERATIONAL DATA ***************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START  112.00   FINISH  112.00

     ATMOSPHERIC PRESSURE:              START   28.00   FINISH   28.00

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0045

     RELATIVE HUMIDITY:                    17.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 COMBINATION SHP/BLEED LOADING



     TEST           POWER                  ENGINE           CORRECTED   GAS GEN      F/A       COMPRESSOR      COMPRESSOR    BLEED
     MODE       SHAFT          AIR          SPEED              FUEL     AIR FLOW     CALC        INLET          DISCHARGE     FLOW
                 HP            HP            RPM               FLOW     LB/SEC       FROM        TEMP           PRESSURE     LB/MIN
                                        N1           N2        LB/HR               EMISSIONS   DEGREES F          PSIA

     22/ 0     152.40         56.88   40700.00      -0.00      266.50      -0.00    0.018800     110.00           50.10        41.97
     19/22     114.30         87.22   40700.00      -0.00      262.50      -0.00    0.018700     112.00           48.60        66.07
     15/19      76.40        107.13   40800.00      -0.00      246.50      -0.00    0.018600     114.00           46.90        83.80
     10/15      38.10        121.16   40700.00      -0.00      241.50      -0.00    0.018200     110.00           45.10        99.35
      5/10       0.0         139.03   40800.00      -0.00      232.50      -0.00    0.019800     114.00           43.70       117.04


    POWER    EXHAUST     EXHAUST         CO        CO         THC       NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
   PERCENT     GAS         GAS          (WET)        2        (WET)     (WET)        2         X
    RATED     TEMP      PRESSURE        PPMV     (WET)        PPMV      PPMV      (WET)     (WET)
     SHP    DEGREES F     PSIA                  PERCENT V                         PPMV      PPMV

      95     1250.00      -0.00        192.20      3.78        9.90     58.30      5.60     63.90     -0.00      -0.00        -0.00
      71     1250.00      -0.00        206.60      3.76       11.80     56.80      5.80     62.50     -0.00      -0.00        -0.00
      47     1250.00      -0.00        245.50      3.74       13.40     58.10      4.70     62.80     -0.00      -0.00        -0.00
      23     1250.00      -0.00        243.40      3.66       13.90     54.40      7.10     61.50     -0.00      -0.00        -0.00
       0     1248.00      -0.00        245.60      3.77       12.50     54.10      6.20     60.30     -0.00      -0.00        -0.00


    POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
   PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
    RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
    SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

      95        9.70      0.28     -0.00   3000.00     -0.00      5.30      2.59      0.08     -0.00    799.50     -0.00      1.41
      71       10.49      0.34     -0.00   3000.00     -0.00      5.22      2.75      0.09     -0.00    787.50     -0.00      1.37
      47       12.50      0.39     -0.00   3000.00     -0.00      5.25      3.08      0.10     -0.00    739.50     -0.00      1.30
      23       12.68      0.41     -0.00   3000.00     -0.00      5.26      3.06      0.10     -0.00    724.50     -0.00      1.27
       0       12.42      0.36     -0.00   3000.00     -0.00      5.01      2.89      0.08     -0.00    697.50     -0.00      1.17


    POWER          CO                CO                THC                NO                NO                NO
   PERCENT                            2                                                      2                 X
    RATED     LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
    SHP

      95         12.357           3820.327            0.362            -0.000            -0.000             6.744
      71         13.669           3907.790            0.447            -0.000            -0.000             6.797
      47         16.795           4029.263            0.525            -0.000            -0.000             7.058
      23         19.236           4549.227            0.628            -0.000            -0.000             7.984
       0         20.763           5016.887            0.604            -0.000            -0.000             8.380
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DATE:   4/28/71

TEST ORGANIZATION:   AIRESEARCH

ENGINE SUPPLIER:     AIRESEARCH

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:   56     ENGINE TYPE AND MODEL:  GTCP85-129                SERIAL NUMBER:      P-34763

                                 RATED SHAFT HORSEPOWER:    160.

      ENGINE TOTAL TIME:                                    0. HRS

      TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

      TIME SINCE:

            N1 COMPRESSOR OVERHAUL:                         0. HRS
            N2 COMPRESSOR OVERHAUL:                         0. HRS
            COMBUSTOR CAN REPLACEMENT:                      0. HRS
            FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
            N1 TURBINE OVERHAUL:                            0. HRS
            N2 TURBINE OVERHAUL:                            0. HRS

      FUEL: JP-4              FUEL H/C RATIO:   1.990

OPERATIONAL DATA ***********************************************************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START    85.00    FINISH    85.00

      ATMOSPHERIC PRESSURE:              START    28.68    FINISH    28.68

      INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0036

      RELATIVE HUMIDITY:                        23.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:    -0.00,  FLOW RATE, LITERS/MIN:    -0.00

      SAMPLE LINE TRANSPORT TIME, SEC:    -0.00

NUMBER OF TESTS:   5

COMMENTS:

 SHP LOADING ONLY



     TEST            POWER              ENGINE              CORRECTED   GAS GEN     F/A       COMPRESSOR      COMPRESSOR    BLEED
     MODE      SHAFT         AIR         SPEED                FUEL      AIR FLOW    CALC        INLET         DISCHARGE     FLOW
                HP           HP           RPM                 FLOW      LB/SEC      FROM        TEMP          PRESSURE      LB/MIN
                                    N1            N2          LB/HR                EMISSIONS   DEGREES F        PSIA

     1/ 0       0.0          0.0   41400.00      -0.00       111.00      -0.00     0.006100     82.00          -0.00         0.0
     6/ 1      40.80         0.0   41500.00      -0.00       129.00      -0.00     0.007500     84.00          -0.00         0.0
    11/ 6      78.50         0.0   41400.00      -0.00       148.00      -0.00     0.008700     84.00          -0.00         0.0
    16/11     116.90         0.0   41300.00      -0.00       169.00      -0.00     0.008900     87.00          -0.00         0.0
    20/16     155.20         0.0   41200.00      -0.00       203.50      -0.00     0.011800     89.00          -0.00         0.0

  POWER    EXHAUST     EXHAUST         CO         CO         THC        NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
  PERCENT    GAS         GAS          (WET)        2        (WET)     (WET)        2         X
  RATED     TEMP       PRESSURE       PPMV       (WET)       PPMV      PPMV      (WET)     (WET)
  SHP     DEGREES F      PSIA                  PERCENT V                         PPMV      PPMV

    0       530.00      -0.00        149.20       1.22      43.50      7.50     13.80     21.30     -0.00     -0.00      -0.00
   25       590.00      -0.00        172.80       1.52      37.10      9.10     13.50     22.50     -0.00     -0.00      -0.00
   49       655.00      -0.00        181.00       1.77      27.80     13.20     14.20     27.40     -0.00     -0.00      -0.00
   73       735.00      -0.00        194.60       1.80      22.90     17.30     15.40     32.70     -0.00     -0.00      -0.00
   96       850.00      -0.00        187.50       2.39      12.70     24.90     15.20     40.10     -0.00     -0.00      -0.00

  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    0       23.68      3.94     -0.00    3050.00     -0.00      5.56      2.63      0.44     -0.00     338.55    -0.00      0.62
   25       22.00      2.70     -0.00    3050.00     -0.00      4.71      2.84      0.35     -0.00     393.45    -0.00      0.61
   49       19.88      1.74     -0.00    3050.00     -0.00      4.94      2.94      0.26     -0.00     451.40    -0.00      0.73
   73       21.01      1.41     -0.00    3050.00     -0.00      5.80      3.55      0.24     -0.00     515.45    -0.00      0.98
   96       15.17      0.59     -0.00    3040.00     -0.00      5.33      3.09      0.12     -0.00     618.64    -0.00      1.08

  POWER         CO                 CO                THC                NO                 NO                NO
  PERCENT                           2                                                       2                 X
  RATED    LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
  SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
   25         69.562          9643.379            8.540            -0.000            -0.000            14.898
   49         37.475          5750.313            3.286            -0.000            -0.000             9.308
   73         30.377          4409.320            2.046            -0.000            -0.000             8.382
   96         19.886          3986.082            0.768            -0.000            -0.000             6.990
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DATE:   4/28/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:   75    ENGINE TYPE AND MODEL:  GTCP85-129              SERIAL NUMBER:    P-34763

                            RATED SHAFT HORSEPOWER:   160.

     ENGINE TOTAL TIME:                                 0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       0. HRS
          N2 COMPRESSOR OVERHAUL:                       0. HRS
          COMBUSTOR CAN REPLACEMENT:                    0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                          0. HRS
          N2 TURBINE OVERHAUL:                          0. HRS

     FUEL: JP-4                 FUEL H/C RATIO:   1.990

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   88.00   FINISH   88.00

     ATMOSPHERIC PRESSURE:              START   28.68   FINISH   28.68

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0036

     RELATIVE HUMIDITY:                 23.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 COMBINATION SHP/BLEED LOADING



    TEST          POWER                ENGINE            CORRECTED  GAS GEN     F/A       COMPRESSOR      COMPRESSOR     BLEED
    MODE      SHAFT          AIR        SPEED              FUEL     AIR FLOW    CALC        INLET         DISCHARGE      FLOW
               HP            HP          RPM               FLOW     LB/SEC      FROM        TEMP          PRESSURE       LB/MIN
                                   N1           N2         LB/HR               EMISSIONS  DEGREES F         PSIA

    22/ 0    153.40        -0.00  10700.00     -0.00      283.20     -0.00    0.018600      88.00          -0.00          58.12
    19/22    115.50        -0.00  40800.00     -0.00      276.20     -0.00    0.018500      88.00          -0.00          79.68
    15/19     78.50        -0.00  40900.00     -0.00      259.40     -0.00    0.017400      88.00          -0.00          88.86
     9/15     39.20        -0.00  40900.00     -0.00      239.50     -0.00    0.016400      98.00          -0.00          98.34
     4/ 9      0.0         -0.00  40900.00     -0.00      226.50     -0.00    0.016100      86.00          -0.00         108.91


  POWER    EXHAUST      EXHAUST          CO         CO         THC       NO        NO        NO     ALDEHYDES   SMOKE    PARTICULATES
 PERCENT     GAS          GAS          (WET)        2        (WET)     (WET)       2         X
  RATED     TEMP       PRESSURE         PPMV      (WET)       PPMV      PPMV     (WET)     (WET)
  SHP     DEGREES F      PSIA                   PERCENT V                         PPMV      PPMV

   95      1250.00       -0.00          130.10      3.75       2.10     61.80      9.90     71.20     -0.00     -0.00       -0.00
   72      1230.00       -0.00          138.40      3.74       3.00     59.30      9.40     68.60     -0.00     -0.00       -0.00
   49      1175.00       -0.00          160.80      3.50       3.00     51.60     11.60     63.20     -0.00     -0.00       -0.00
   24      1130.00       -0.00          203.10      3.31       5.40     44.50     14.00     58.40     -0.00     -0.00       -0.00
    0      1100.00       -0.00          222.20      3.24       5.40     41.50     14.90     56.40     -0.00     -0.00       -0.00


  POWER     MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED      LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP       LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   95         6.63      0.06     -0.00    3010.00    -0.00      5.96      1.88      0.02     -0.00    852.43    -0.00      1.69
   72         7.09      0.09     -0.00    3010.00    -0.00      5.77      1.96      0.02     -0.00    831.36    -0.00      1.59
   49         8.80      0.09     -0.00    3010.00    -0.00      5.68      2.28      0.02     -0.00    780.79    -0.00      1.47
   24        11.77      0.18     -0.00    3010.00    -0.00      5.56      2.82      0.04     -0.00    720.89    -0.00      1.33
    0        13.17      0.18     -0.00    3010.00    -0.00      5.49      2.98      0.04     -0.00    681.76    -0.00      1.24


  POWER         CO                 CO              THC               NO               NO               NO
 PERCENT                           2                                                  2                X
  RATED     LB/1K HP-HR       LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR
  SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
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DATE:   5/18/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:   57    ENGINE TYPE AND MODEL:  GTC85-90                SERIAL NUMBER:    P-5786

                            RATED SHAFT HORSEPOWER:     0.

     ENGINE TOTAL TIME:                                0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      0. HRS
          N2 COMPRESSOR OVERHAUL:                      0. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
          N1 TURBINE OVERHAUL:                         0. HRS
          N2 TURBINE OVERHAUL:                         0. HRS

     FUEL: JP-5                  FUEL H/C RATIO:   1.877

OPERATIONAL DATA *******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   83.00   FINISH   83.00

     ATMOSPHERIC PRESSURE:              START   28.79   FINISH   28.79

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0026

     RELATIVE HUMIDITY:                     16.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 NO SHP DATA
 PROBE LOCATIONS 1-10


   TEST           POWER              ENGINE          CORRECTED   GAS GEN     F/A       COMPRESSOR      COMPRESSOR     BLEED
   MODE      SHAFT        AIR         SPEED            FUEL      AIR FLOW    CALC        INLET         DISCHARGE      FLOW
              HP          HP           RPM             FLOW      LB/SEC      FROM        TEMP          PRESSURE       LB/MIN
                                   N1          N2      LB/HR                EMISSIONS   DEGREES F        PSIA

   1/ 0      0.0          0.0   41200.00     -0.00    107.90      -0.00     0.007500      78.00          51.70         0.0
   2/ 1      0.0        55.84   41100.00     -0.00    139.20      -0.00     0.010100      80.00          50.20        43.41
   3/ 2      0.0        85.92   40900.00     -0.00    164.20      -0.00     0.012300      80.00          48.70        68.80
   4/ 3      0.0       106.99   40800.00     -0.00    184.50      -0.00     0.014800      85.00          46.80        88.33
   5/ 4      0.0       114.34   40700.00     -0.00    216.20      -0.00     0.018100      92.00          40.20       109.76


 POWER    EXHAUST     EXHAUST          CO        CO        THC       NO        NO        NO    ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS         GAS          (WET)        2       (WET)     (WET)       2         X
 RATED     TEMP       PRESSURE        PPMV      (WET)      PPMV      PPMV     (WET)     (WET)
 SHP     DEGREES F      PSIA                  PERCENT V                        PPMV      PPMV

   0      565.00       -0.00         418.90      1.49    144.30      3.50     11.80     15.30     -0.00      -0.00       -0.00
   0      710.00       -0.00         419.50      2.03     55.60     11.30     13.70     25.00     -0.00      -0.00       -0.00
   0      850.00       -0.00         389.10      2.49     18.20     20.20     13.30     33.50     -0.00      -0.00       -0.00
   0     1000.00       -0.00         327.80      3.00      4.40     30.30     11.50     41.90     -0.00      -0.00       -0.00
   0     1170.00       -0.00         266.90      3.66      4.50     43.60      8.50     52.10     -0.00      -0.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC       NO2 .      CO2       NO        NOX       CO        HC        NO2       CO2        NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0       53.68     10.57     -0.00   3010.00     -0.00      3.21      5.79      1.14     -0.00    324.78     -0.00      0.35
   0       39.80      3.01     -0.00   3010.00     -0.00      3.90      5.54      0.42     -0.00    421.78     -0.00      0.54
   0       30.26      0.81     -0.00   3040.00     -0.00      4.28      4.97      0.13     -0.00    499.17     -0.00      0.70
   0       21.10      0.16     -0.00   3040.00     -0.00      4.43      3.89      0.03     -0.00    560.88     -0.00      0.82
   0       14.05      0.14     -0.00   3030.00     -0.00      4.51      3.06      0.03     -0.00    655.09     -0.00      0.97


 POWER          CO               CO              THC                NO                NO                NO
PERCENT                           2                                                     2                 X
 RATED     LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
 SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
   0          99.216         7553.566           7.514            -0.000            -0.000             9.715
   0          57.823         5809.855           1.548            -0.000            -0.000             8.189
   0          36.387         5242.527           0.279            -0.000            -0.000             7.636
   0          26.562         5729.234           0.257            -0.000            -0.000             8.522
```

DATE: 5/18/71

TEST ORGANIZATION: AIRESEARCH

ENGINE SUPPLIER: AIRESEARCH

ENGINE DATA **

CAL ID NUMBER: 76 ENGINE TYPE AND MODEL: GTC85-90 SERIAL NUMBER: P-5786

RATED SHAFT HORSEPOWER: 0.

ENGINE TOTAL TIME: 0. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	0. HRS
N2 COMPRESSOR OVERHAUL:	0. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	0. HRS
N1 TURBINE OVERHAUL:	0. HRS
N2 TURBINE OVERHAUL:	0. HRS

FUEL: JP-5 FUEL H/C RATIO: 1.877

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 88.00 FINISH 88.00

ATMOSPHERIC PRESSURE: START 28.79 FINISH 28.79

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0026

RELATIVE HUMIDITY: 16.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: -0.00

SAMPLE LINE TRANSPORT TIME, SEC: -0.00

NUMBER OF TESTS: 5

COMMENTS:

NO SHP DATA
PROBE LOCATIONS 11-20

TEST MODE	POWER SHAFT HP	POWER AIR HP	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	CORRECTED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	F/A CALC FROM EMISSIONS	COMPRESSOR INLET TEMP DEGREES F	COMPRESSOR DISCHARGE PRESSURE PSIA	BLEED FLOW LB/MIN
1/ 0	0.0	0.0	41200.00	-0.00	107.90	-0.00	0.007100	84.00	51.70	0.0
2/ 1	0.0	57.68	41100.00	-0.00	137.10	-0.00	0.009700	86.00	50.00	44.52
3/ 2	0.0	86.06	40900.00	-0.00	162.10	-0.00	0.011900	87.00	48.30	68.59
4/ 3	0.0	109.02	40800.00	-0.00	185.50	-0.00	0.014300	90.00	46.80	89.19
5/ 4	0.0	111.35	40700.00	-0.00	211.00	-0.00	0.016600	92.00	39.70	108.44

POWER PERCENT RATED SHP	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
0	565.00	-0.00	405.70	1.40	157.70	7.00	9.00	16.00	-0.00	-0.00	-0.00
0	710.00	-0.00	398.50	1.96	55.30	17.20	8.90	26.10	-0.00	-0.00	-0.00
0	850.00	-0.00	364.00	2.41	16.60	27.30	7.90	35.10	-0.00	-0.00	-0.00
0	1000.00	-0.00	290.10	2.92	4.80	37.30	5.90	43.20	-0.00	-0.00	-0.00
0	1170.00	-0.00	231.80	3.38	2.60	44.20	6.30	50.50	-0.00	-0.00	-0.00

POWER PERCENT RATED SHP	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
0	55.20	12.26	-0.00	3000.00	-0.00	3.57	5.96	1.32	-0.00	323.70	-0.00	0.38
0	39.32	3.12	-0.00	3040.00	-0.00	4.23	5.39	0.43	-0.00	416.78	-0.00	0.58
0	29.23	0.76	-0.00	3040.00	-0.00	4.64	4.74	0.12	-0.00	492.78	-0.00	0.75
0	19.28	0.18	-0.00	3040.00	-0.00	4.71	3.58	0.03	-0.00	563.92	-0.00	0.87
0	13.26	0.08	-0.00	3040.00	-0.00	4.75	2.80	0.02	-0.00	641.44	-0.00	1.00

POWER PERCENT RATED SHP	CO LB/1K HP-HR	CO_2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO_2 LB/1K HP-HR	NO_x LB/1K HP-HR
*****HORSEPOWER-HR BASIS NOT CALCULABLE*****						
0	93.469	7225.906	7.411	-0.000	-0.000	10.059
0	55.056	5725.965	1.433	-0.000	-0.000	8.732
0	32.814	5172.656	0.311	-0.000	-0.000	8.023
0	25.126	5760.457	0.161	-0.000	-0.000	8.995

DATE: 6/16/71

TEST ORGANIZATION: AIRESEARCH

ENGINE SUPPLIER: AIRESEARCH

ENGINE DATA **

CAL ID NUMBER: 59 ENGINE TYPE AND MODEL: GTC85-90-2 SERIAL NUMBER: P-34276A

RATED SHAFT HORSEPOWER: 0.

ENGINE TOTAL TIME: 0. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 0. HRS
N2 COMPRESSOR OVERHAUL: 0. HRS
COMBUSTOR CAN REPLACEMENT: 0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 0. HRS
N1 TURBINE OVERHAUL: 0. HRS
N2 TURBINE OVERHAUL: 0. HRS

FUEL: JP-5 FUEL H/C RATIO: 1.928

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 108.00 FINISH 108.00

ATMOSPHERIC PRESSURE: START 28.70 FINISH 28.70

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0046

RELATIVE HUMIDITY: 9.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: -0.00

SAMPLE LINE TRANSPORT TIME, SEC: -0.00

NUMBER OF TESTS: 5

COMMENTS:

NO SHP DATA
PROBE LOCATIONS 1-10

TEST MODE	POWER SHAFT HP	POWER AIR HP	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	CORRECTED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	F/A CALC FROM EMISSIONS	COMPRESSOR INLET TEMP DEGREES F	COMPRESSOR DISCHARGE PRESSURE PSIA	BLEED FLOW LB/MIN
1/ 0	0.0	0.0	41200.00	-0.00	-0.00	28.00	0.007300	109.00	-0.00	0.0
2/ 1	0.0	47.65	41100.00	-0.00	-0.00	-0.00	0.009600	107.00	49.20	35.98
3/ 2	0.0	80.90	40800.00	-0.00	-0.00	-0.00	0.011900	108.00	47.30	63.40
4/ 3	0.0	106.25	40700.00	-0.00	-0.00	-0.00	0.014500	108.00	45.80	86.05
5/ 4	0.0	70.88	40500.00	-0.00	-0.00	-0.00	0.016800	108.00	29.30	101.07

POWER PERCENT RATED SHP	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
0	602.00	-0.00	381.60	1.47	22.70	8.40	8.10	16.50	-0.00	-0.00	-0.00
0	745.00	-0.00	461.10	1.93	11.10	12.70	11.20	23.90	-0.00	-0.00	-0.00
0	900.00	-0.00	494.60	2.38	4.50	17.30	11.90	29.20	-0.00	-0.00	-0.00
0	1052.00	-0.00	438.80	2.93	0.60	25.20	11.50	36.70	-0.00	-0.00	-0.00
0	1170.00	-0.00	385.50	3.38	0.50	34.00	9.40	43.40	-0.00	-0.00	-0.00

POWER PERCENT RATED SHP	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS FMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS FMI NO LB/HR	MASS FMI NOX LB/HR
0	49.93	1.69	-0.00	3020.00	-0.00	3.54	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
0	45.83	0.63	-0.00	3020.00	-0.00	3.90	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
0	39.83	0.21	-0.00	3020.00	-0.00	3.86	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
0	28.77	0.02	-0.00	3020.00	-0.00	3.95	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
0	21.88	0.01	-0.00	3010.00	-0.00	4.05	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00

POWER PERCENT RATED SHP	CO LB/1K HP-HR	CO_2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO_2 LB/1K HP-HR	NO_x LB/1K HP-HR
*****HORSEPOWER-HR BASIS NOT CALCULABLE*****						
0	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
0	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
0	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
0	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000

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DATE:  6/16/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:   AIRESEARCH

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:   77    ENGINE TYPE AND MODEL:  GTC85-90-2            SERIAL NUMBER:    P-34276B

                            RATED SHAFT HORSEPOWER:      0.

     ENGINE TOTAL TIME:                                 0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       0. HRS
          N2 COMPRESSOR OVERHAUL:                       0. HRS
          COMBUSTOR CAN REPLACEMENT:                    0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                          0. HRS
          N2 TURBINE OVERHAUL:                          0. HRS

     FUEL: JP-5                 FUEL H/C RATIO:    1.928

OPERATIONAL DATA ******************************************************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START  108.00    FINISH  108.00

      ATMOSPHERIC PRESSURE:              START   28.70    FINISH   28.70

      INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0046

      RELATIVE HUMIDITY:                     9.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

      SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 NO SHP DATA
 PROBE LOCATIONS 11-20


                     POWER              ENGINE              CORRECTED  GAS GEN     F/A        COMPRESSOR     COMPRESSOR   BLEED
  TEST                                  SPEED                 FUEL     AIR FLOW    CALC        INLET         DISCHARGE    FLOW
  MODE        SHAFT           AIR        RPM                  FLOW     LB/SEC      FROM        TEMP          PRESSURE     LB/MIN
               HP             HP                              LB/HR                EMISSIONS   DEGREES F      PSIA
                                      N1          N2

  1/ 0        0.0             0.0  41300.00      -0.00      101.00      -0.00     0.007300     107.00         -0.00        0.0
  2/ 1        0.0           48.10  41100.00      -0.00      127.00      -0.00     0.009500     108.00         49.20       36.25
  3/ 2        0.0           81.69  40800.00      -0.00      157.00      -0.00     0.011900     109.00         47.50       63.64
  4/ 3        0.0          107.09  40600.00      -0.00      179.00      -0.00     0.014800     108.00         46.00       86.34
  5/ 4        [illegible]   70.98  40500.00      -0.00      198.00      -0.00     0.017100     108.00         29.30      101.21


 POWER     EXHAUST      EXHAUST          CO          CO         THC       NO        NO        NO     ALDEHYDES   SHOKE    PARTICULATES
PERCENT      GAS          GAS           (WET)          2        (WET)     (WET)       2         X
 RATED      TEMP       PRESSURE         PPMV        (WET)       PPMV      PPMV      (WET)     (WET)
  SHP     DEGREES F      PSIA                      PERCENT V                        PPMV      PPMV

   0       602.00       -0.00          398.50        1.47       27.00     13.60     4.50      18.10     -0.00      -0.00      -0.00
   0       750.00       -0.00          457.90        1.90       15.30     17.80     5.40      23.20     -0.00      -0.00      -0.00
   0       900.00       -0.00          500.30        2.39        8.60     25.30     4.30      29.60     -0.00      -0.00      -0.00
   0      1050.00       -0.00          448.50        2.99        1.80     34.10     2.60      36.70     -0.00      -0.00      -0.00
   0      1167.00       -0.00          381.60        3.45        0.80     39.80     3.60      43.50     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0       52.35      2.02     -0.00    3020.00    -0.00      3.90      5.29      0.20     -0.00     305.02    -0.00      0.39
   0       46.23      0.88     -0.00    3020.00    -0.00      3.85      5.87      0.11     -0.00     393.54    -0.00      0.49
   0       40.12      0.39     -0.00    3010.00    -0.00      3.90      6.30      0.06     -0.00     472.57    -0.00      0.61
   0       28.81      0.07     -0.00    3010.00    -0.00      3.88      5.16      0.01     -0.00     538.79    -0.00      0.69
   0       21.21      0.02     -0.00    3010.00    -0.00      3.97      4.20      0.00     -0.00     595.98    -0.00      0.79


 POWER          CO                CO               THC               NO               NO              NO
PERCENT                             2                                                   2               X
 RATED     LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR     LB/1K HP-HR
  SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****        2.337            -0.000            -0.000          10.158
   0           122.077          7974.418            0.757            -0.000            -0.000           7.492
   0            77.105          5784.902            0.112            -0.000            -0.000           6.477
   0            48.161          5031.230            0.070            -0.000            -0.000          11.072
   0            59.175          8397.004
```

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DATE:   6/16/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:   78    ENGINE TYPE AND MODEL:  GTCP85-90-2              SERIAL NUMBER:   P-24376C

                            RATED SHAFT HORSEPOWER:     0.

     ENGINE TOTAL TIME:                                0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      0. HRS
          N2 COMPRESSOR OVERHAUL:                      0. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
          N1 TURBINE OVERHAUL:                         0. HRS
          N2 TURBINE OVERHAUL:                         0. HRS

     FUEL: JP-5                FUEL H/C RATIO:   1.928

OPERATIONAL DATA ***************************************************************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START  105.00   FINISH  105.00

      ATMOSPHERIC PRESSURE:              START   28.70   FINISH   28.70

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0046

      RELATIVE HUMIDITY:                  9.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

      SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

 NUMBER OF TESTS:   5

 COMMENTS:

  NO SHP DATA
  12 POINT FIXED PROBE


     TEST            POWER                     ENGINE             CORRECTED   GAS GEN     F/A        COMPRESSOR      COMPRESSOR     BLEED
     MODE      SHAFT            AIR             SPEED                FUEL     AIR FLOW    CALC          INLET         DISCHARGE     FLOW
                HP              HP               RPM                 FLOW     LB/SEC      FROM          TEMP          PRESSURE      LB/MIN
                                           N1             N2        LB/HR                EMISSIONS    DEGREES F        PSIA

     1/ 0       0.0             0.0    41300.00       -0.00        101.50      -0.00     0.007200      104.00          51.10         0.0
     2/ 1       0.0           47.60    41100.00       -0.00        127.00      -0.00     0.009400      106.00          49.40        35.86
     3/ 2       0.0           80.37    40900.00       -0.00        155.00      -0.00     0.011800      105.00          48.00        62.40
     4/ 3       0.0          104.33    40700.00       -0.00        179.00      -0.00     0.014200      105.00          46.50        83.63
     5/ 4       0.0          114.45    40500.00       -0.00        198.00      -0.00     0.016700      105.00          43.60        98.12


   POWER     EXHAUST      EXHAUST          CO          CO         THC        NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
  PERCENT      GAS          GAS          (WET)          2        (WET)     (WET)         2           X
   RATED       TEMP       PRESSURE        PPMV       (WET)        PPMV      PPMV       (WET)       (WET)
   SHP      DEGREES F       PSIA                    PERCENT V                           PPMV        PPMV

     0        605.00       -0.00         384.00       1.45       30.00     10.60       6.00       16.60     -0.00       -0.00        -0.00
     0        742.00       -0.00         462.30       1.89       18.00     17.60       4.80       22.50     -0.00       -0.00        -0.00
     0        900.00       -0.00         488.90       2.38       12.80     18.10      10.10       28.20     -0.00       -0.00        -0.00
     0       1045.00       -0.00         451.60       2.87        5.60     25.20      -0.00       35.00     -0.00       -0.00        -0.00
     0       1156.00       -0.00         405.40       3.37        5.60     30.90       8.90       39.80     -0.00       -0.00        -0.00


   POWER     MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT       CO        HC        NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO        NOX
   RATED      LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   SHP       LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

     0        51.00      2.29     -0.00    3030.00     -0.00      3.63      5.18      0.23     -0.00     307.54     -0.00      0.37
     0        46.90      1.05     -0.00    3020.00     -0.00      3.74      5.96      0.13     -0.00     383.54     -0.00      0.48
     0        39.47      0.59     -0.00    3010.00     -0.00      3.74      6.12      0.09     -0.00     466.55     -0.00      0.58
     0        30.24      0.21     -0.00    3010.00     -0.00      3.88      5.41      0.04     -0.00     538.79     -0.00      0.69
     0        23.05      0.18     -0.00    3010.00     -0.00      3.72      4.56      0.04     -0.00     595.98     -0.00      0.74


   POWER           CO                 CO                 THC                 NO                NO                NO
  PERCENT                              2                                                         2                 X
   RATED      LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR
   SHP

 *****HORSEPOWER-HR BASIS NOT CALCULABLE*****
     0          125.147            8057.625            2.801             -0.000             -0.000             9.992
     0           76.129            5804.875            1.144             -0.000             -0.000             7.217
     0           51.885            5164.426            0.367             -0.000             -0.000             6.657
     0           39.874            5207.453            0.315             -0.000             -0.000             6.431
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DATE:   6/16/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:   79     ENGINE TYPE AND MODEL:  GTC85-90-2            SERIAL NUMBER:    P-243760

                             RATED SHAFT HORSEPOWER:      0.

      ENGINE TOTAL TIME:                                   0. HRS

      TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

      TIME SINCE:

           N1 COMPRESSOR OVERHAUL:                          0. HRS
           N2 COMPRESSOR OVERHAUL:                          0. HRS
           COMBUSTOR CAN REPLACEMENT:                       0. HRS
           FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
           N1 TURBINE OVERHAUL:                             0. HRS
           N2 TURBINE OVERHAUL:                             0. HRS

      FUEL: JP-5                 FUEL H/C RATIO:    1.928

OPERATIONAL DATA ******************************************************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   108.00    FINISH  108.00

      ATMOSPHERIC PRESSURE:              START    28.70    FINISH   28.70

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0046

      RELATIVE HUMIDITY:                    9.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

      SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

 NO SHP
 12 POINT MOVABLE PROBE(AVERAGE OF LOCATIONS 1-20)
EMISSION RATES NOT CALCULATED BY TEST ORGANIZATION


   TEST            POWER                ENGINE             CORRECTED   GAS GEN      F/A       COMPRESSOR      COMPRESSOR     BLEED
   MODE      SHAFT         AIR           SPEED               FUEL      AIR FLOW     CALC        INLET          DISCHARGE     FLOW
              HP           HP             RPM                FLOW      LB/SEC       FROM        TEMP           PRESSURE      LB/MIN
                                   N1           N2           LB/HR                EMISSIONS   DEGREES F          PSIA

   1/ 0       0.0          0.0   41300.00     -0.00         101.00      -0.00     0.007300     107.00           14.10          0.0
   2/ 1       0.0        48.10   41100.00     -0.00         127.00      -0.00     0.009500     108.00           49.20         36.25
   3/ 2       0.0        81.69   40800.00     -0.00         157.00      -0.00     0.011900     109.00           47.50         63.64
   4/ 3       0.0       107.09   40600.00     -0.00         179.00      -0.00     0.014800     108.00           46.00         86.34
   5/ 4       0.0        70.98   40500.00     -0.00         198.00      -0.00     0.017100     108.00           29.30        101.21


 POWER     EXHAUST      EXHAUST          CO         CO         THC        NO         NO         NO      ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS           (WET)         2        (WET)     (WET)        2          X
 RATED      TEMP        PRESSURE        PPMV       (WET)       PPMV      PPMV       (WET)      (WET)
 SHP      DEGREES F      PSIA                    PERCENT V                          PPMV       PPMV

   0       602.00       -0.00          390.00       1.47       24.80     11.00       6.30      17.30     -0.00      -0.00       -0.00
   0       750.00       -0.00          459.50       1.91       13.50     15.30       8.30      23.50     -0.00      -0.00       -0.00
   0       900.00       -0.00          497.50       2.39        6.50     21.30       8.10      29.40     -0.00      -0.00       -0.00
   0      1050.00       -0.00          443.70       2.96        1.20     29.70       6.60      36.70     -0.00      -0.00       -0.00
   0      1167.00       -0.00          393.50       3.42        0.65     36.90       6.50      43.40     -0.00      -0.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 SHP      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0       -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00
   0       -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00
   0       -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00
   0       -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00
   0       -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00


 POWER          CO                CO                THC               NO                NO                NO
 PERCENT                            2                                                     2                 X
 RATED      LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
 SHP

*****HORSEPOWER-HR BASIS NOT CALCULABLE*****
   0          -0.000            -0.000            -0.000            -0.000            -0.000            -0.000
   0          -0.000            -0.000            -0.000            -0.000            -0.000            -0.000
   0          -0.000            -0.000            -0.000            -0.000            -0.000            -0.000
   0          -0.000            -0.000            -0.000            -0.000            -0.000            -0.000
```

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DATE:   5/ 5/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:   58    ENGINE TYPE AND MODEL:  GTC85-90-2              SERIAL NUMBER:     P-24504

                            RATED SHAFT HORSEPOWER:      0.

     ENGINE TOTAL TIME:                                 0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       0. HRS
          N2 COMPRESSOR OVERHAUL:                       0. HRS
          COMBUSTOR CAN REPLACEMENT:                    0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                          0. HRS
          N2 TURBINE OVERHAUL:                          0. HRS

     FUEL: JP-4                FUEL H/C RATIO:   1.990

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    79.00   FINISH   79.00

     ATMOSPHERIC PRESSURE:              START    28.54   FINISH    0.0

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0042

     RELATIVE HUMIDITY:                     23.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

 NUMBER OF TESTS:   5

 COMMENTS:


      TEST            POWER                 ENGINE               CORRECTED   GAS GEN      F/A       COMPRESSOR      COMPRESSOR    BLEED
      MODE      SHAFT           AIR          SPEED                  FUEL     AIR FLOW     CALC         INLET        DISCHARGE     FLOW
                 HP             HP            RPM                   FLOW     LB/SEC       FROM         TEMP          PRESSURE     LB/MIN
                                         N1             N2         LB/HR               EMISSIONS    DEGREES F         PSIA

      1/ 0       0.0           0.0    40850.00       -0.00       -0.00       -0.00     0.006500       77.00          53.50          0.0
      2/ 1       0.0          42.31   40760.00       -0.00       -0.00       -0.00     0.008800       76.00          52.50         31.76
      3/ 2       0.0          82.57   40660.00       -0.00       -0.00       -0.00     0.010900       91.00          51.20         62.87
      4/ 3       0.0         107.97   40580.00       -0.00       -0.00       -0.00     0.013400       82.00          50.00         83.95
      5/ 4       0.0         127.37   40450.00       -0.00       -0.00       -0.00     0.017000       77.00          49.30        101.34


    POWER     EXHAUST       EXHAUST           CO         CO         THC        NO         NO          NO       ALDEHYDES    SMOKE    PARTICULATES
   PERCENT      GAS           GAS           (WET)         2        (WET)     (WET)         2           X
    RATED      TEMP        PRESSURE          PPMV      (WET)        PPMV      PPMV       (WET)       (WET)
     SHP     DEGREES F       PSIA                    PERCENT V                            PPMV        PPMV

      0        545.00        -0.00          341.50      1.30       58.00       3.10      12.90       16.10      -0.00       -0.00        -0.00
      0        675.00        -0.00          429.90      1.75       46.80       6.20      14.30       20.60      -0.00       -0.00        -0.00
      0        825.00        -0.00          501.90      2.17       36.90      12.70      15.30       27.90      -0.00       -0.00        -0.00
      0        975.00        -0.00          498.00      2.68       24.50      20.70      13.70       34.40      -0.00       -0.00        -0.00
      0       1125.00        -0.00          419.50      3.41        6.30      30.60      12.60       43.20      -0.00       -0.00        -0.00


    POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
   PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
    RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
     SHP     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

      0       50.12      4.86     -0.00    3010.00    -0.00      3.87     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00
      0       46.89      2.92     -0.00    3000.00    -0.00      3.69     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00
      0       43.99      1.85     -0.00    2990.00    -0.00      4.02     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00
      0       35.39      0.99     -0.00    2990.00    -0.00      4.02     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00
      0       23.42      0.20     -0.00    2990.00    -0.00      3.96     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00


    POWER          CO                CO              THC                 NO                NO                NO
   PFRCENT                            2                                                     2                 X
    RATED     LB/1K HP-HR       LB/1K HP-HR .    LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
     SHP

  *****HORSEPOWER-HR BASIS NOT CALCULABLE*****
      0          -0.000            -0.000           -0.000             -0.000            -0.000            -0.000
      0          -0.000            -0.000           -0.000             -0.000            -0.000            -0.000
      0          -0.000            -0.000           -0.000             -0.000            -0.000            -0.000
      0          -0.000            -0.000           -0.000             -0.000            -0.000            -0.000
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TABLE IV

TURBINE/TURBOPROP ENGINES

(UNWEIGHTED PROCESSING)

CONTENTS:

IV-2 TO IV-299 INDIVIDUAL ENGINE RUNS – COMPLETELY PROCESSED
IV-300 TO IV-312 MODEL SUMMARIES
IV-313 TO IV-361 INDIVIDUAL ENGINE RUNS – MASS EMISSION CONVERSIONS ONLY
IV-362 INDIVIDUAL RUN – INPUT DATA REPRODUCED ONLY

DATE: 6/18/71

TEST ORGANIZATION: S W R I KELLY

ENGINE SUPPLIER: USAF, KELLY AFB

ENGINE DATA **

CAL ID NUMBER: 2 ENGINE TYPE AND MODEL: T56-A7B SERIAL NUMBER: AF-103141

RATED HORSEPOWER: 3755.

ENGINE TOTAL TIME: 5114. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	0. HRS
N2 COMPRESSOR OVERHAUL:	-0. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	0. HRS
N1 TURBINE OVERHAUL:	0. HRS
N2 TURBINE OVERHAUL:	-0. HRS

FUEL: JP-4 FUEL H/C RATIO: 1.995

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 80.00 FINISH 80.00

ATMOSPHERIC PRESSURE: START 29.26 FINISH 29.26

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0214

RELATIVE HUMIDITY: 63.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 0.50

NUMBER OF TESTS: 8

COMMENTS:

F/A CALCULATION BASED ON EXHAUST COMPOSITION FOR LAST RUN

ELAPSED TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	1/ 0	2325.00	61	13800.00	-0.00	1465.00	30.80	0.013200	-0.00	-0.00	1505.00
5.30	2/ 1	3202.00	85	13800.00	-0.00	1810.00	30.80	0.016300	-0.00	-0.00	1710.00
11.00	3/ 2	3553.00	94	13800.00	-0.00	1945.00	30.80	0.017500	-0.00	-0.00	1780.00
16.30	4/ 3	865.00	23	13300.00	-0.00	910.00	28.70	0.009800	-0.00	-0.00	1168.00
19.30	5/ 4	3684.00	98	14200.00	-0.00	1980.00	32.60	0.016800	-0.00	-0.00	1900.00
21.30	6/ 5	865.00	23	13300.00	-0.00	905.00	28.70	0.008800	-0.00	-0.00	1170.00
24.00	8/ 6	277.00	7	13430.00	-0.00	715.00	29.20	0.006800	-0.00	-0.00	1046.00
26.30	7/ 8	119.00	3	9980.00	-0.00	555.00	15.00	0.010300	-0.00	-0.00	1128.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
61	-0.00	-0.00	28.00	2.37	0.0	-0.00	-0.00	68.00	-0.00	-0.00	-0.00
85	-0.00	-0.00	26.00	3.08	0.0	-0.00	-0.00	96.00	-0.00	-0.00	-0.00
94	-0.00	-0.00	24.00	3.28	0.0	-0.00	-0.00	102.00	-0.00	-0.00	-0.00
23	-0.00	-0.00	27.00	1.66	0.0	-0.00	-0.00	32.00	-0.00	-0.00	-0.00
98	-0.00	-0.00	23.00	3.54	0.0	-0.00	-0.00	102.00	-0.00	-0.00	-0.00
23	-0.00	-0.00	30.00	1.64	5.00	-0.00	-0.00	32.00	-0.00	-0.00	-0.00
7	-0.00	-0.00	27.00	1.32	2.00	-0.00	-0.00	24.00	-0.00	-0.00	-0.00
3	-0.00	-0.00	271.00	2.07	225.00	-0.00	-0.00	25.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
61	2.36	0.0	-0.00	3135.17	-0.00	9.40	3.45	0.0	-0.00	4593.02	-0.00	13.78
85	1.68	0.0	-0.00	3136.22	-0.00	10.22	3.05	0.0	-0.00	5676.56	-0.00	18.50
94	1.46	0.0	-0.00	3136.58	-0.00	10.20	2.84	0.0	-0.00	6100.64	-0.00	19.83
23	3.24	0.0	-0.00	3133.77	-0.00	6.32	2.95	0.0	-0.00	2851.73	-0.00	5.75
98	1.30	0.0	-0.00	3136.83	-0.00	9.45	2.57	0.0	-0.00	6210.93	-0.00	18.71
23	3.65	0.35	-0.00	3132.19	-0.00	6.39	3.30	0.32	-0.00	2834.63	-0.00	5.78
7	4.08	0.17	-0.00	3131.99	-0.00	5.95	2.92	0.12	-0.00	2239.37	-0.00	4.26
3	25.54	12.15	-0.00	3065.42	-0.00	3.87	14.18	6.74	-0.00	1701.31	-0.00	2.15

POWER PERCENT RATED T.O.	CO LB/1K HP-HR	CO_2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO_2 LB/1K HP-HR	NO_x LB/1K HP-HR
61	1.485	1975.491	0.0	-0.000	-0.000	5.925
85	0.952	1772.818	0.0	-0.000	-0.000	5.777
94	0.900	1717.039	0.0	-0.000	-0.000	5.582
23	3.413	3296.804	0.0	-0.000	-0.000	6.644
98	0.597	1685.919	0.0	-0.000	-0.000	5.078
23	3.815	3277.030	0.364	-0.000	-0.000	6.685
7	10.524	8084.383	0.446	-0.000	-0.000	15.366
3	119.123	14296.711	56.644	-0.000	-0.000	18.050

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    CAL ID NUMBER:    2   ENGINE TYPE AND MODEL: T56-A7B              SERIAL NUMBER:   AE-103141

TEST ORGANIZATION:  S W R I KELLY


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      CO        FUEL    LB CO /      ENERGY   LB CO /
             POWER        HP      RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR      LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.030       112.6    20.906    575.503     1.000       19.00     6.620      182.24    36.326      35.67   0.18558
TAKEOFF     1.000      3755.0     2.500   2032.360     1.000        0.50     0.021       16.94     1.230      31.29   0.00067
CLIMBOUT    0.900      3379.5     2.814   1891.839     1.000        2.50     0.117       78.83     1.487     140.81   0.00083
APPROACH    0.300      1126.5     3.458   1071.003     1.000        4.50     0.259       80.33     3.229      84.49   0.00307
TAXI-IDLE   0.030       112.6    20.906    575.503     1.000        7.00     2.439       67.14    36.326      13.14   0.18558

                                 TOTAL FOR CYCLE:                            9.456      425.47                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            22.226
                                 LBS POLLUTANT/1K HP-HR/CYCLE:              30.964
                                 LBS POLLUTANT/1000K HP AT T.O.:             0.555


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      HC        FUEL    LB HC /      ENERGY   LB HC /
             POWER        HP      RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR      LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.030       112.6     8.487    575.503     1.000       19.00     2.688      182.24    14.747      35.67   0.07534
TAKEOFF     1.000      3755.0     0.059   2032.360     1.000        0.50     0.000       16.94     0.029      31.29   0.00002
CLIMBOUT    0.900      3379.5     0.065   1891.839     1.000        2.50     0.003       78.83     0.035     140.81   0.00002
APPROACH    0.300      1126.5     0.081   1071.003     1.000        4.50     0.006       80.33     0.075      84.49   0.00007
TAXI-IDLE   0.030       112.6     8.487    575.503     1.000        7.00     0.990       67.14    14.747      13.14   0.07534

                                 TOTAL FOR CYCLE:                            3.687      425.47                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             8.665
                                 LBS POLLUTANT/1K HP-HR/CYCLE:              12.072
                                 LBS POLLUTANT/1000K HP AT T.O.:             0.130


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL    LB NOX/      ENERGY   LB NOX/
             POWER        HP      RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR      LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.030       112.6     2.084    575.503     1.000       19.00     0.660      182.24     3.620      35.67   0.01850
TAKEOFF     1.000      3755.0    18.149   2032.360     1.000        0.50     0.151       16.94     8.930      31.29   0.00483
CLIMBOUT    0.900      3379.5    19.766   1891.839     1.000        2.50     0.824       78.83    10.448     140.81   0.00585
APPROACH    0.300      1126.5     7.283   1071.003     1.000        4.50     0.546       80.33     6.800      84.49   0.00647
TAXI-IDLE   0.030       112.6     2.084    575.503     1.000        7.00     0.243       67.14     3.620      13.14   0.01850

                                 TOTAL FOR CYCLE:                            2.424      425.47                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             5.697
                                 LBS POLLUTANT/1K HP-HR/CYCLE:               7.937
                                 LBS POLLUTANT/1000K HP AT T.O.:            40.278
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DATE:  6/18/71

TEST ORGANIZATION:  S W R I KELLY

ENGINE SUPPLIER:    USAF, KELLY AFB

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:    3    ENGINE TYPE AND MODEL:  T56-A7B                  SERIAL NUMBER:    AE-104886

                          RATED HORSEPOWER:     3755.

     ENGINE TOTAL TIME:                            4865. HRS

     TIME SINCE HOT SECTION OVERHAUL:                 0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                     0. HRS
          N2 COMPRESSOR OVERHAUL:                    -0. HRS
          COMBUSTOR CAN REPLACEMENT:                  0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     0. HRS
          N1 TURBINE OVERHAUL:                        0. HRS
          N2 TURBINE OVERHAUL:                       -0. HRS

     FUEL: JP-4                FUEL H/C RATIO:   1.995

 OPERATIONAL DATA ***************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   90.00   FINISH   88.00

      ATMOSPHERIC PRESSURE:              START   29.27   FINISH   29.27

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0186

      RELATIVE HUMIDITY:                   52.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

      SAMPLE LINE TRANSPORT TIME, SEC:    0.50

  NUMBER OF TESTS:    8

  COMMENTS:

  F/A CALCULATION BASED ON EXHAUST COMPOSITION FOR LAST RUN


 ELAPSED    TEST          POWER              ENGINE              MEASURED   GAS GEN     CALC    COMPRESSOR   ENGINE     TURBINE
  TIME      MODE    THRUST,LBS  PERCENT       SPEED                FUEL    AIR FLOW     F/A    DISCHARGE   PRESSURE     INLET
                        OR       RATED         RPM                 FLOW     LB/SEC                TEMP       RATIO       TEMP
                       SHP       T.O.      N1           N2         LB/HR                       DEGREES F     EPR      DEGREES F

   0.0      1/ 0    2193.00       58   13780.00      -0.00      1430.00     30.10    0.013200     -0.00       -0.00      1506.00
   4.00     2/ 1    3070.00       81   13800.00      -0.00      1755.00     30.10    0.016200     -0.00       -0.00      1710.00
   9.00     3/ 2    3421.00       91   13800.00      -0.00      1885.00     30.10    0.017400     -0.00       -0.00      1780.00
  15.00     4/ 3     821.00       21   13280.00      -0.00       875.00     28.00    0.008700     -0.00       -0.00      1178.00
  17.00     5/ 4    3808.00      101   14200.00      -0.00      2055.00     31.80    0.018000     -0.00       -0.00      1910.00
  18.00     6/ 5     821.00       21   13280.00      -0.00       880.00     28.00    0.008700     -0.00       -0.00      1182.00
  20.00     8/ 6     299.00        7   13440.00      -0.00       705.00     28.50    0.006900     -0.00       -0.00      1062.00
  22.30     7/ 8     119.00        3    9970.00      -0.00       565.00     15.40    0.010200     -0.00       -0.00      1146.00


                                                                                     NO      ALDEHYDES   SMOKE   PARTICULATES
  POWER     EXHAUST      EXHAUST          CO           CO       THC       NO        NO         X
 PERCENT      GAS          GAS          (WET)           2      (WET)     (WET)       2       (WET)
  RATED      TEMP        PRESSURE        PPMV        (WET)     PPMV      PPMV     (WET)      PPMV
  T.O.    DEGREES F       PSIA                    PERCENT V                       PPMV

    58       -0.00        -0.00         40.00        2.42      0.0      -0.00     -0.00      73.00     -0.00      -0.00      -0.00
    81       -0.00        -0.00         39.00        3.07      1.00     -0.00     -0.00     103.00     -0.00      -0.00      -0.00
    91       -0.00        -0.00         39.00        3.75      1.00     -0.00     -0.00      33.00     -0.00      -0.00      -0.00
    21       -0.00        -0.00         45.00        1.60      2.00     -0.00     -0.00      33.00     -0.00      -0.00      -0.00
   101       -0.00        -0.00         39.00        3.48      0.0      -0.00     -0.00     111.00     -0.00      -0.00      -0.00
    21       -0.00        -0.00         45.00        1.62      2.00     -0.00     -0.00      33.00     -0.00      -0.00      -0.00
     7       -0.00        -0.00         45.00        1.30      2.00     -0.00     -0.00      24.00     -0.00      -0.00      -0.00
     3       -0.00        -0.00        287.00        2.05    228.00     -0.00     -0.00      26.00     -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO       NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    58       3.30      0.0      -0.00    3133.69    -0.00      9.88      4.71      0.0      -0.00    4481.18    -0.00     14.13
    81       2.53      0.04     -0.00    3134.79    -0.00     10.99      4.45      0.07     -0.00    5501.55    -0.00     19.30
    91       2.39      0.04     -0.00    3135.01    -0.00      3.33      4.51      0.07     -0.00    5909.50    -0.00      6.27
    21       5.60      0.14     -0.00    3129.68    -0.00      6.75      4.90      0.12     -0.00    2738.47    -0.00      5.90
   101       2.18      0.0      -0.00    3135.45    -0.00     10.46      4.48      0.0      -0.00    6443.34    -0.00     21.49
    21       5.53      0.14     -0.00    3129.79    -0.00      6.66      4.87      0.12     -0.00    2754.22    -0.00      5.87
     7       6.89      0.14     -0.00    3127.57    -0.00      6.04      4.85      0.12     -0.00    2204.94    -0.00      4.26
     3      27.29     12.41     -0.00    3061.95    -0.00      4.06     15.41      7.01     -0.00    1730.00    -0.00      2.29


                                                                                                  NO
  POWER          CO               CO               THC               NO               NO           X
 PERCENT                           2                                                   2
  RATED     LB/1K HP-HR      LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR      LB/1K HP-HR   LB/1K HP-HR
  T.O.

    58         2.150          2043.400            0.0              -0.000           -0.000          6.444
    81         1.449          1792.035            0.021            -0.000           -0.000          6.285
    91         1.317          1727.418            0.019            -0.000           -0.000          1.834
    21         5.971          3335.539            0.152            -0.000           -0.000          7.192
   101         1.176          1692.055            0.0              -0.000           -0.000          5.642
    21         5.931          3354.709            0.151            -0.000           -0.000          7.144
     7        16.244          7374.367            0.414            -0.000           -0.000         14.232
     3       129.536         14517.840           58.937            -0.000           -0.000         19.275
   CAL ID NUMBER:    3   ENGINE TYPE AND MODEL: T56-A7B                 SERIAL NUMBER:   AE-104886

TEST ORGANIZATION:  S W R I KELLY

     MODE    FRACTIONAL     POWER   EMISSION    FUEL       USAGE     TIME IN      CO         FUEL     LB CO /      ENERGY    LB CO /
               POWER         HP       RATE      RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL    HP-HR     HP-HR
                                     LB/HR      LB/HR                 MIN.       LBS.        LBS.

TAXI-IDLE     0.030        112.6    15.642    555.406     1.000      19.00      4.953      175.88     28.164       35.67    0.13886
TAKEOFF       1.000       3755.0     4.254   2038.633     1.000       0.50      0.035       16.99      2.087       31.29    0.00113
CLIMBOUT      0.900       3379.5     4.416   1891.581     1.000       2.50      0.184       78.82      2.335      140.81    0.00131
APPROACH      0.300       1126.5     5.229   1053.412     1.000       4.50      0.392       79.01      4.964       84.49    0.00464
TAXI-IDLE     0.030        112.6    15.642    555.406     1.000       7.00      1.825       64.80     28.164       13.14    0.13886

                                 TOTAL FOR CYCLE:                               7.390      415.49                 305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               17.787
                                 LBS POLLUTANT/1K HP-HR/CYCLE:                 24.197
                                 LBS POLLUTANT/1000K HP AT T.O.:                0.944

     MODE    FRACTIONAL     POWER   EMISSION    FUEL       USAGE     TIME IN      HC         FUEL     LB HC /      ENERGY    LB HC /
               POWER         HP       RATE      RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL    HP-HR     HP-HR
                                     LB/HR      LB/HR                 MIN.       LBS.        LBS.

TAXI-IDLE     0.030        112.6     7.971    555.406     1.000      19.00      2.524      175.88     14.353       35.67    0.07076
TAKEOFF       1.000       3755.0     0.065   2038.633     1.000       0.50      0.001       16.99      0.032       31.29    0.00002
CLIMBOUT      0.900       3379.5     0.087   1891.581     1.000       2.50      0.004       78.82      0.046      140.81    0.00003
APPROACH      0.300       1126.5     0.135   1053.412     1.000       4.50      0.010       79.01      0.128       84.49    0.00012
TAXI-IDLE     0.030        112.6     7.971    555.406     1.000       7.00      0.930       64.80     14.353       13.14    0.07076

                                 TOTAL FOR CYCLE:                               3.469      415.49                 305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:                8.348
                                 LBS POLLUTANT/1K HP-HR/CYCLE:                 11.357
                                 LBS POLLUTANT/1000K HP AT T.O.:                0.144

     MODE    FRACTIONAL     POWER   EMISSION    FUEL       USAGE     TIME IN      NOX        FUEL     LB NOX/      ENERGY    LB NOX/
               POWER         HP       RATE      RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL    HP-HR     HP-HR
                                     LB/HR      LB/HR                 MIN.       LBS.        LBS.

TAXI-IDLE     0.030        112.6     2.239    555.406     1.000      19.00      0.709      175.88      4.031       35.67    0.01987
TAKEOFF       1.000       3755.0    21.551   2038.633     1.000       0.50      0.180       16.99     10.571       31.29    0.00574
CLIMBOUT      0.900       3379.5    20.763   1891.581     1.000       2.50      0.865       78.82     10.976      140.81    0.00614
APPROACH      0.300       1126.5     7.660   1053.412     1.000       4.50      0.574       79.01      7.272       84.49    0.00680
TAXI-IDLE     0.030        112.6     2.239    555.406     1.000       7.00      0.261       64.80      4.031       13.14    0.01987

                                 TOTAL FOR CYCLE:                               2.589      415.49                 305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:                6.232
                                 LBS POLLUTANT/1K HP-HR/CYCLE:                  8.478
                                 LBS POLLUTANT/1000K HP AT T.O.:               47.827
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DATE:   6/18/71

TEST ORGANIZATION:  S W R I KELLY

ENGINE SUPPLIER:    USAF, KELLY AFB

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:     4    ENGINE TYPE AND MODEL:  T56-A7B                 SERIAL NUMBER:     AF-101854

                             RATED HORSEPOWER:     3755.

     ENGINE TOTAL TIME:                            7793. HRS

     TIME SINCE HOT SECTION OVERHAUL:                 0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                     0. HRS
          N2 COMPRESSOR OVERHAUL:                    -0. HRS
          COMBUSTOR CAN REPLACEMENT:                  0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     0. HRS
          N1 TURBINE OVERHAUL:                        0. HRS
          N2 TURBINE OVERHAUL:                       -0. HRS

     FUEL: JP-4               FUEL H/C RATIO:    1.995

OPERATIONAL DATA ***********^*********************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   82.00   FINISH   81.00

     ATMOSPHERIC PRESSURE:              START   28.90   FINISH   28.90

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0187

     RELATIVE HUMIDITY:                      -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    0.50

NUMBER OF TESTS:   8

COMMENTS:

F/A CALCULATION BASED ON EXHAUST COMPOSITION FOR LAST RUN


                                                                                                            TURBINE
                                                           MEASURED   GAS GEN     CALC     COMPRESSOR   ENGINE    INLET
 ELAPSED   TEST        POWER               ENGINE           FUEL     AIR FLOW     F/A      DISCHARGE   PRESSURE   TEMP
 TIME      MODE   THRUST,LBS  PERCENT      SPEED            FLOW     LB/SEC                  TEMP       RATIO    DEGREES F
                     OR       RATED        RPM              LB/HR                         DEGREES F      EPR
                     SHP      T.O.      N1          N2

   0.0     1/ 0    2214.00     58    13800.00     -0.00    1440.00    30.80    0.013000     -0.00       -0.00     1510.00
  10.50    2/ 1    3092.00     82    13800.00     -0.00    1770.00    30.80    0.016000     -0.00       -0.00     1710.00
  16.35    3/ 2    3399.00     90    13800.00     -0.00    1910.00    30.80    0.017200     -0.00       -0.00     1780.00
  24.20    4/ 3     823.00     21    13300.00     -0.00     890.00    28.70    0.008600     -0.00       -0.00     1180.00
  26.05    5/ 4    3618.00     96    14240.00     -0.00    2000.00    32.60    0.017000     -0.00       -0.00     1890.00
  26.35    4/ 5     821.00     21    13270.00     -0.00     895.00    28.70    0.008700     -0.00       -0.00     1180.00
  27.50    3/ 6     256.00      6    13450.00     -0.00     705.00    28.10    0.007000     -0.00       -0.00     1052.00
  30.50    7/ 9      87.00      2     9940.00     -0.00     555.00    14.90    0.010300     -0.00       -0.00     1155.00


                                                                            NO         NO       ALDEHYDES   SMOKE   PARTICULATES
 POWER    EXHAUST      EXHAUST          CO         CO       THC      NO       2          X
 PERCENT    GAS          GAS          (WET)         2      (WET)   (WET)    (WET)      (WET)
 RATED     TEMP        PRESSURE        PPMV      (WET)      PPMV    PPMV     PPMV       PPMV
 T.O.    DEGREES F       PSIA                   PERCENT V

   58      -0.00         -0.00         32.00      2.28      0.0     61.00    5.00      66.00      -0.00      -0.00     -0.00
   82      -0.00         -0.00         28.00      2.98      0.0     89.00    1.00      90.00      -0.00      -0.00     -0.00
   90      -0.00         -0.00         25.00      3.21      0.0     98.00    3.00     101.00      -0.00      -0.00     -0.00
   21      -0.00         -0.00         32.00      1.67      0.0      0.0     0.0       31.00      -0.00      -0.00     -0.00
   96      -0.00         -0.00         26.00      3.60      0.0     95.00    0.0        0.0       -0.00      -0.00     -0.00
   21      -0.00         -0.00         33.00      1.67      0.0     25.00    5.00      30.00      -0.00      -0.00     -0.00
    6      -0.00         -0.00         34.00      1.33      0.0     18.00    4.00      22.00      -0.00      -0.00     -0.00
    2      -0.00         -0.00        300.00      2.08    348.00    10.00    0.0        0.0       -0.00      -0.00     -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   58      2.40      0.0       0.72    3134.47     8.77      9.49      4.03      0.0       1.03    4513.64    12.62     13.66
   82      1.88      0.0       0.11    3135.92     9.79      9.90      3.32      0.0       0.19    5550.58    17.33     17.52
   90      1.55      0.0       0.31    3136.43    10.01     10.32      2.97      0.0       0.59    5990.58    19.12     19.70
   21      3.82      0.0       0.0     3132.87     0.0       6.08      3.40      0.0       0.0     2788.25     0.0       5.41
   96      1.44      0.0       0.0     3136.61     8.65      0.0       2.88      0.0       0.0     6273.21    17.31      0.0
   21      3.94      0.0       0.98    3132.68     4.90      5.88      3.53      0.0       0.88    2803.75     4.39      5.27
    6      5.09      0.0       0.98    3130.87     4.43      5.41      3.59      0.0       0.69    2207.26     3.12      3.82
    2     27.94     18.56      0.0     3044.04     1.53      0.0      15.51     10.30      0.0     1689.44     0.85      0.0


                                                                                   NO              NO
 POWER          CO               CO             THC             NO                2               X
 PERCENT                          2                                                            LB/1K HP-HR
 RATED     LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR
 T.O.

   58         1.821          2038.680          0.0             5.702           0.467           6.169
   82         1.074          1795.143          0.0             5.605           0.063           5.668
   90         0.474          1762.453          0.0             5.625           0.172           5.797
   21         4.132          3387.915          0.0             0.0             0.0             6.574
   96         0.797          1733.889          0.0             4.783           0.0             0.0
   21         4.295          3415.043          0.0             5.344           1.069           6.413
    6        14.028          8622.117          0.0            12.199           2.711          14.910
    2       178.256         19418.879        118.426           9.760           0.0             0.0
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     CAL ID NUMBER:    4   ENGINE TYPE AND MODEL: T56-A7B                    SERIAL NUMBER:   AE-101854

TEST ORGANIZATION:  S W R I KELLY

  NODF   FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN      CO         FUEL    LB CO /    ENERGY   LB CO /
           POWER         HP       RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   HP-HR     HP-HR
                                 LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.030       112.6   12.931     576.902     1.000       19.00     4.095      182.69    22.414      35.67   0.11479
TAKEOFF     1.000      3755.0    2.701    2083.368     1.000        0.50     0.023       17.36     1.296      31.29   0.00072
CLIMBOUT    0.900      3379.5    3.141    1924.923     1.000        2.50     0.131       80.21     1.632     140.81   0.00093
APPROACH    0.300      1126.5    3.703    1031.957     1.000        4.50     0.278       77.40     3.588      84.49   0.00329
TAXI-IDLF   0.030       112.6   12.931     576.902     1.000        7.00     1.509       67.31    22.414      13.14   0.11479

                              TOTAL FOR CYCLE:                               6.034      424.95                305.41
                              LBS POLLUTANT/1K LB FUEL/CYCLE:               14.200
                              LBS POLLUTANT/1K HP-HR/CYCLE:                 19.758
                              LBS POLLUTANT/1000K HP AT T.O.:                0.599


  MODE   FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN      HC         FUEL    LB HC /    ENERGY   LB HC /
           POWER         HP       RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   HP-HR     HP-HR
                                 LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.030       112.6    7.534     576.902     1.000       19.00     2.386      182.69    13.060      35.67   0.06688
TAKEOFF     1.000      3755.0    0.007    2083.368     1.000        0.50     0.000       17.36     0.003      31.29   0.00000
CLIMBOUT    0.900      3379.5    0.0      1924.923     1.000        2.50     0.0         80.21     0.0       140.81   0.0
APPROACH    0.300      1126.5    0.0      1031.957     1.000        4.50     0.0         77.40     0.0        84.49   0.0
TAXI-IDLE   0.030       112.6    7.534     576.902     1.000        7.00     0.879       67.31    13.060      13.14   0.06688

                              TOTAL FOR CYCLE:                               3.265      424.95                305.41
                              LBS POLLUTANT/1K LB FUEL/CYCLE:                7.683
                              LBS POLLUTANT/1K HP-HR/CYCLE:                 10.690
                              LBS POLLUTANT/1000K HP AT T.O.:                0.016


  MODE   FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN     NOX         FUEL    LB NOX/    ENERGY   LB NOX/
           POWER         HP       RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   HP-HR     HP-HR
                                 LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.030       112.6    1.474     576.902     1.000       19.00     0.467      182.69     2.555      35.67   0.01308
TAKEOFF     1.000      3755.0   21.849    2083.368     1.000        0.50     0.182       17.36    10.487      31.29   0.00582
CLIMBOUT    0.900      3379.5   19.881    1924.923     1.000        2.50     0.828       80.21    10.328     140.81   0.00588
APPROACH    0.300      1126.5    6.952    1031.957     1.000        4.50     0.521       77.40     6.737      84.49   0.00617
TAXI-IDLE   0.030       112.6    1.474     576.902     1.000        7.00     0.172       67.31     2.555      13.14   0.01308

                              TOTAL FOR CYCLE:                               2.171      424.95                305.41
                              LBS POLLUTANT/1K LB FUEL/CYCLE:                5.108
                              LBS POLLUTANT/1K HP-HR/CYCLE:                  7.107
                              LBS POLLUTANT/1000K HP AT T.O.:               48.488
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DATE:  6/21/71

TEST ORGANIZATION:  S W R I KELLY

ENGINE SUPPLIER:    USAF, KELLY AFB

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:    5    ENGINE TYPE AND MODEL:  T56-A7B                     SERIAL NUMBER:    AE-101776

                            RATED HORSEPOWER:     3755.

     ENGINE TOTAL TIME:                                   7751. HRS

     TIME SINCE HOT SECTION OVERHAUL:                       0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                           0. HRS
          N2 COMPRESSOR OVERHAUL:                          -0. HRS
          COMBUSTOR CAN REPLACEMENT:                        0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:           0. HRS
          N1 TURBINE OVERHAUL:                              0. HRS
          N2 TURBINE OVERHAUL:                             -0. HRS

     FUEL: JP-4               FUEL H/C RATIO:   1.995

OPERATIONAL DATA ************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   83.00   FINISH   83.00

     ATMOSPHERIC PRESSURE:              START   29.21   FINISH   29.21

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0184

     RELATIVE HUMIDITY:                    67.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    0.50

NUMBER OF TESTS:   8

COMMENTS:

F/A CALCULATION BASED ON EXHAUST COMPOSITION FOR LAST RUN


                               POWER                   ENGINE              MEASURED    GAS GEN      CALC    COMPRESSOR    ENGINE     TURBINE
ELAPSED    TEST                                        SPEED               FUEL        AIR FLOW     F/A     DISCHARGE     PRESSURE   INLET
TIME       MODE       THRUST,LBS   PERCENT             RPM                 FLOW        LB/SEC               TEMP          RATIO      TEMP
                          OR       RATED                                   LB/HR                            DEGREES F     EPR        DEGREES F
                          SHP      T.O.         N1            N2

   0.0      1/ 0       2259.00       60     13820.00       -0.00       1450.00      30.60     0.013200      -0.00        -0.00      1505.00
   5.00     2/ 1       3202.00       85     13800.00       -0.00       1795.00      30.60     0.016300      -0.00        -0.00      1705.00
  10.30     3/ 2       3531.00       94     13800.00       -0.00       1925.00      30.60     0.017500      -0.00        -0.00      1780.00
  15.30     4/ 3        838.00       22     13200.00       -0.00        900.00      28.00     0.008900      -0.00        -0.00      1180.00
  18.30     5/ 4       3618.00       96     14200.00       -0.00       2010.00      32.40     0.017200      -0.00        -0.00      1850.00
  19.30     4/ 5        838.00       22     13110.00       -0.00        885.00      27.60     0.008900      -0.00        -0.00      1175.00
  21.00     9/ 4        232.00        6     13320.00       -0.00        685.00      28.50     0.006700      -0.00        -0.00      1040.00
  23.00     7/ 8         94.00        2      9840.00       -0.00        555.00      13.40     0.011500      -0.00        -0.00      1175.00


 POWER      EXHAUST       EXHAUST          CO          CO        THC        NO         NO         NO      ALDEHYDES    SMOKE    PARTICULATES
PERCENT      GAS           GAS            (WET)         2        (WET)      (WET)        2          X
 RATED       TEMP        PRESSURE         PPMV       (WET)       PPMV       PPMV       (WET)      (WET)
 T.O.     DEGREES F        PSIA                     PERCENT V                          PPMV       PPMV

  60        -0.00         -0.00          31.00       2.54       42.00      62.00       5.00      69.00      -0.00       -0.00       -0.00
  85        -0.00         -0.00          26.00       3.17       46.00      93.00       2.00      95.00      -0.00       -0.00       -0.00
  94        -0.00         -0.00          23.00       3.42       44.00     102.00       3.00     105.00      -0.00       -0.00       -0.00
  22        -0.00         -0.00          27.00       1.67       37.00       0.0        0.0       31.00      -0.00       -0.00       -0.00
  96        -0.00         -0.00          21.00       3.64       46.00       0.0        0.0      105.00      -0.00       -0.00       -0.00
  22        -0.00         -0.00          27.00       1.70       37.00       0.0        0.0       31.00      -0.00       -0.00       -0.00
   6        -0.00         -0.00          27.00       1.33       46.00       0.0        0.0       22.00      -0.00       -0.00       -0.00
   2        -0.00         -0.00         323.00       2.32      315.00       0.0        0.0       26.00      -0.00       -0.00       -0.00


 POWER     MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
PERCENT       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
 RATED      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
 T.O.      LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

  60         2.43       1.89       0.64     3129.88      7.99       8.89       3.53       2.74       0.93     4538.32     11.58      12.89
  85         1.63       1.66       0.21     3131.76      9.60       9.81       2.93       2.97       0.37     5621.50     17.24      17.61
  94         1.34       1.47       0.29     3132.74      9.77      10.05       2.58       2.83       0.55     6030.51     18.80      19.36
  22         3.22       2.53       0.0      3126.89      0.0        6.07       2.90       2.27       0.0      2814.20      0.0        5.46
  96         1.15       1.44       0.0      3133.11      0.0        9.45       2.31       2.90       0.0      6297.54      0.0       18.99
  22         3.16       2.48       0.0      3127.10      0.0        5.96       2.80       2.20       0.0      2767.48      0.0        5.28
   6         4.03       3.94       0.0      3121.74      0.0        5.40       2.76       2.70       0.0      2138.39      0.0        3.70
   2        27.07      15.12       0.0      3054.86      0.0        3.58      15.02       8.39       0.0      1695.45      0.0        1.99


 POWER           CO                CO                 THC                NO                 NO                 NO
PERCENT                              2                                                         2                  X
 RATED      LB/1K HP-HR       LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR
 T.O.

  60            1.561          2008.994             1.211              5.126              0.413              5.705
  85            0.916          1755.623             0.929              5.384              0.116              5.500
  94            0.731          1707.877             0.801              5.325              0.157              5.482
  22            3.456          3358.235             2.712              0.0                0.0                6.517
  96            0.639          1740.614             0.802              0.0                0.0                5.249
  22            3.338          3302.487             2.620              0.0                0.0                6.296
   6           11.909          9217.203            11.620              0.0                0.0               15.939
   2          159.421         18036.691            89.266              0.0                0.0               21.131
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     CAL ID NUMBER:     5   ENGINE TYPE AND MODEL: T56-A7B                     SERIAL NUMBER:   AE-101776

TEST ORGANIZATION:  S W R I KELLY


    MODE   FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     CO        FUEL    LB CO /     ENERGY   LB CO /
             POWER        HP       RATE       RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL   HP-HR     HP-HR
                                  LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.030        112.6   15.074    564.752     1.000      19.00     4.773     178.84    26.691      35.67    0.13381
TAKEOFF     1.000       3755.0    2.049   2084.544     1.000       0.50     0.017      17.37     0.983      31.29    0.00055
CLIMBOUT    0.900       3379.5    2.498   1897.624     1.000       2.50     0.104      79.07     1.317     140.81    0.00074
APPROACH    0.300       1126.5    3.041   1043.322     1.000       4.50     0.228      78.25     2.915      84.49    0.00270
TAXI-IDLE   0.030        112.6   15.074    564.752     1.000       7.00     1.759      65.89    26.691      13.14    0.13381

                                 TOTAL FOR CYCLE:                           6.881     419.41                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           16.407
                                 LBS POLLUTANT/1K HP-HR/CYCLE:             22.532
                                 LBS POLLUTANT/1000K HP AT T.O.:            0.455


    MODE   FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     HC        FUEL    LB HC /     ENERGY   LB HC /
             POWER        HP       RATE       RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL   HP-HR     HP-HR
                                  LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.030        112.6    6.711    564.752     1.000      19.00     2.125     178.84    11.882      35.67    0.05957
TAKEOFF     1.000       3755.0    2.760   2084.544     1.000       0.50     0.023      17.37     1.324      31.29    0.00074
CLIMBOUT    0.900       3379.5    2.758   1897.624     1.000       2.50     0.115      79.07     1.454     140.81    0.00082
APPROACH    0.300       1126.5    2.383   1043.322     1.000       4.50     0.179      78.25     2.284      84.49    0.00212
TAXI-IDLE   0.030        112.6    6.711    564.752     1.000       7.00     0.783      65.89    11.882      13.14    0.05957

                                 TOTAL FOR CYCLE:                           3.225     419.41                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            7.688
                                 LBS POLLUTANT/1K HP-HR/CYCLE:             10.558
                                 LBS POLLUTANT/1000K HP AT T.O.:            6.126


    MODE   FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN    NOX        FUEL    LB NOX/     ENERGY   LB NOX/
             POWER        HP       RATE       RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL   HP-HR     HP-HR
                                  LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.030        112.6    2.292    564.752     1.000      19.00     0.726     178.84     4.059      35.67    0.02035
TAKEOFF     1.000       3755.0   20.240   2084.544     1.000       0.50     0.169      17.37     9.709      31.29    0.00539
CLIMBOUT    0.900       3379.5   18.988   1897.624     1.000       2.50     0.791      79.07    10.006     140.81    0.00562
APPROACH    0.300       1126.5    6.983   1043.322     1.000       4.50     0.524      78.25     6.693      84.49    0.00620
TAXI-IDLE   0.030        112.6    2.292    564.752     1.000       7.00     0.267      65.89     4.059      13.14    0.02035

                                 TOTAL FOR CYCLE:                           2.477     419.41                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            5.905
                                 LBS POLLUTANT/1K HP-HR/CYCLE:              8.110
                                 LBS POLLUTANT/1000K HP AT T.O.:           44.917
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DATE:  6/21/71

TEST ORGANIZATION:  S W R I KELLY

ENGINE SUPPLIER:   USAF, KELLY AFB

ENGINE DATA ******************************************************************************************

     CAL ID NUMBER:    6    ENGINE TYPE AND MODEL:  T56-A7B                    SERIAL NUMBER:    AE-104313

                             RATED HORSEPOWER:     3755.

     ENGINE TOTAL TIME:                             6027. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      0. HRS
          N2 COMPRESSOR OVERHAUL:                     -0. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
          N1 TURBINE OVERHAUL:                         0. HRS
          N2 TURBINE OVERHAUL:                        -0. HRS

     FUEL: JP-4                FUEL H/C RATIO:   1.995

 OPERATIONAL DATA ***********************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   74.00   FINISH   74.00

      ATMOSPHERIC PRESSURE:              START   29.19   FINISH   29.19

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0176

      RELATIVE HUMIDITY:                      66.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

      SAMPLE LINE TRANSPORT TIME, SEC:    0.50

 NUMBER OF TESTS:   8

 COMMENTS:

 F/A CALCULATION BASED ON EXHAUST COMPOSITION FOR LAST RUN


                           POWER                  ENGINE               MEASURED   GAS GEN      CALC    COMPRESSOR    ENGINE      TURBINE
  ELAPSED    TEST                                 SPEED                  FUEL     AIR FLOW      F/A    DISCHARGE    PRESSURE      INLET
   TIME      MODE    THRUST,LBS. PERCENT           RPM                   FLOW     LB/SEC                 TEMP       RATIO        TEMP
                         OR       RATED                                 LB/HR                         DEGREES F      EPR       DEGREES F
                        SHP       T.O.         N1          N2

     0.0     1/ 0     2456.00      65      13800.00      -0.00        1510.00     31.20    0.013400     -0.00       -0.00       1850.00
     6.30    2/ 1     3355.00      89      13800.00      -0.00        1865.00     31.20    0.016600     -0.00       -0.00       1712.00
    10.30    3/ 2     3662.00      97      13800.00      -0.00        1980.00     31.20    0.017600     -0.00       -0.00       1775.00
    17.30    4/ 3      834.00      22      13100.00      -0.00         895.00     28.10    0.008800     -0.00       -0.00       1146.00
    19.00    5/ 4     3728.00      99      14220.00      -0.00        2045.00     33.00    0.017200     -0.00       -0.00       1860.00
    21.00    4/ 5      840.00      22      13200.00      -0.00         870.00     28.60    0.008400     -0.00       -0.00       1132.00
    22.00    8/ 4      241.00       6      13420.00      -0.00         720.00     29.50    0.006800     -0.00       -0.00       1026.00
    24.00    7/ 8      111.00       2       9980.00      -0.00         550.00     15.90    0.009600     -0.00       -0.00       1084.00


                                                                                 NO           NO      ALDEHYDES    SMOKE   PARTICULATES
   POWER     EXHAUST       EXHAUST          CO          CO        THC        NO          2            X
  PERCENT      GAS           GAS           (WET)         2       (WET)     (WET)       (WET)        (WET)
   RATED      TEMP        PRESSURE         PPMV       (WET)      PPMV      PPMV        PPMV         PPMV
   T.O.     DEGREES F       PSIA                    PERCENT V

    65        -0.00        -0.00          40.00       2.52       0.0      63.00        9.00        72.00       -0.00      -0.00      -0.00
    89        -0.00        -0.00          26.00       3.10       0.0      90.00        8.00        98.00       -0.00      -0.00      -0.00
    97        -0.00        -0.00          21.00       3.34       0.0      97.00        7.00       104.00       -0.00      -0.00      -0.00
    22        -0.00        -0.00          25.00       1.60       0.0      24.00        5.00        29.00       -0.00      -0.00      -0.00
    99        -0.00        -0.00          17.00       3.74       0.0       0.0         0.0         96.00       -0.00      -0.00      -0.00
    22        -0.00        -0.00          24.00       1.58       0.0       0.0         0.0         29.00       -0.00      -0.00      -0.00
     6        -0.00        -0.00          21.00       1.26       0.0      17.00        6.00        23.00       -0.00      -0.00      -0.00
     2        -0.00        -0.00         217.00       1.94     250.00      7.00       15.00        22.00       -0.00      -0.00      -0.00


   POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
   RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    65        3.17      0.0       1.17    3133.90      8.19      9.36      4.78      0.0       1.77    4732.18     12.37     14.13
    89        1.67      0.0       0.85    3136.24      9.52     10.36      3.12      0.0       1.58    5849.09     17.75     19.33
    97        1.76      0.0       0.69    3136.90      9.52     10.21      2.49      0.0       1.36    6211.06     18.86     20.22
    22        3.12      0.0       1.02    3133.98      4.91      5.94      2.79      0.0       0.92    2804.91      4.40      5.31
    99        0.91      0.0       0.0     3137.45      0.0       8.42      1.86      0.0       0.0     6416.07      0.0      17.22
    22        3.03      0.0       0.0     3134.11      0.0       6.01      2.64      0.0       0.0     2726.68      0.0       5.23
     6        3.32      0.0       1.56    3133.65      4.42      5.98      2.39      0.0       1.12    2256.23      3.18      4.31
     2       21.82     14.40      2.48    3065.09      1.16      3.63     12.00      7.92      1.36    1685.80      0.64      2.00


                                                                                            NO                   NO
   POWER          CO                 CO               THC                NO                  2                    X
  PERCENT                             2                                                LB/1K HP-HR          LB/1K HP-HR
   RATED     LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR       LB/1K HP-HR
   T.O.

    65          1.946            1926.784            0.0               5.036               0.719                5.755
    89          0.931            1743.395            0.0               5.291               0.470                5.762
    97          0.679            1696.084            0.0               5.149               0.372                5.521
    22          3.345            3363.199            0.0               5.274               1.099                6.373
    99          0.498            1721.049            0.0               0.0                 0.0                  4.618
    22          3.138            3246.043            0.0               0.0                 0.0                  6.228
     6          9.931            9361.945            0.0              13.205               4.660               17.865
     2        108.119           15187.375           71.339              5.729              12.276               18.005
    CAL ID NUMBER:    6   ENGINE TYPE AND MODEL: T56-A7B             SERIAL NUMBER:   AE-104313

TEST ORGANIZATION:  S W R I KELLY

  MODE     FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     CO       FUEL     LB CO /    ENERGY   LB CO /
             POWER        HP       RATE      RATE    WT FACTOR    MODE     MASS      MASS   1K LB FUEL   HP-HR    HP-HR
                                  LB/HR     LB/HR                 MIN.     LBS.      LBS.

TAXI-IDLE    0.030      112.6    14.231    536.839    1.000      19.00    4.506     170.00    26.509     35.67   0.12633
TAKEOFF      1.000     3755.0     1.863   2079.368    1.000       0.50    0.016      17.33     0.896     31.29   0.00050
CLIMBOUT     0.900     3379.5     3.296   1895.471    1.000       2.50    0.137      78.98     1.739    140.81   0.00098
APPROACH     0.300     1126.5     3.389   1076.472    1.000       4.50    0.254      80.74     3.148     84.49   0.00301
TAXI-IDLE    0.030      112.6    14.231    536.839    1.000       7.00    1.660      62.63    26.509     13.14   0.12633

                               TOTAL FOR CYCLE:                           6.574     409.67              305.41
                               LBS POLLUTANT/1K LB FUEL/CYCLE:           16.046
                               LBS POLLUTANT/1K HP-HR/CYCLE:             21.525
                               LBS POLLUTANT/1000K HP AT T.O.:            0.414


  MODE     FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     HC       FUEL     LB HC /    ENERGY   LB HC /
             POWER        HP       RATE      RATE    WT FACTOR    MODE     MASS      MASS   1K LB FUEL   HP-HR    HP-HR
                                  LB/HR     LB/HR                 MIN.     LBS.      LBS.

TAXI-IDLE    0.030      112.6     6.377    536.839    1.000      19.00    2.019     170.00    11.878     35.67   0.05661
TAKEOFF      1.000     3755.0     0.064   2079.368    1.000       0.50    0.001      17.33     0.031     31.29   0.00002
CLIMBOUT     0.900     3379.5     0.044   1895.471    1.000       2.50    0.002      78.98     0.023    140.81   0.00001
APPROACH     0.300     1126.5     0.0     1076.472    1.000       4.50    0.0        80.74     0.0       84.49   0.0
TAXI-IDLE    0.030      112.6     6.377    536.839    1.000       7.00    0.744      62.63    11.878     13.14   0.05661

                               TOTAL FOR CYCLE:                           2.766     409.67              305.41
                               LBS POLLUTANT/1K LB FUEL/CYCLE:            6.751
                               LBS POLLUTANT/1K HP-HR/CYCLE:              9.056
                               LBS POLLUTANT/1000K HP AT T.O.:            0.143


  MODE     FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN    NOX       FUEL     LB NOX/    ENERGY   LB NOX/
             POWER        HP       RATE      RATE    WT FACTOR    MODE     MASS      MASS   1K LB FUEL   HP-HR    HP-HR
                                  LB/HR     LB/HR                 MIN.     LBS.      LBS.

TAXI-IDLE    0.030      112.6     2.108    536.839    1.000      19.00    0.667     170.00     3.926     35.67   0.01871
TAKEOFF      1.000     3755.0    22.790   2079.368    1.000       0.50    0.190      17.33    10.960     31.29   0.00607
CLIMBOUT     0.900     3379.5    20.198   1895.471    1.000       2.50    0.842      78.98    10.656    140.81   0.00598
APPROACH     0.300     1126.5     7.037   1076.472    1.000       4.50    0.528      80.74     6.537     84.49   0.00625
TAXI-IDLE    0.030      112.6     2.108    536.839    1.000       7.00    0.246      62.63     3.926     13.14   0.01871

                               TOTAL FOR CYCLE:                           2.473     409.67              305.41
                               LBS POLLUTANT/1K LB FUEL/CYCLE:            6.036
                               LBS POLLUTANT/1K HP-HR/CYCLE:              8.096
                               LBS POLLUTANT/1000K HP AT T.O.:           50.577
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DATE:   6/22/71

TEST ORGANIZATION:  S W R I KELLY

ENGINE SUPPLIER:    USAF, KELLY AFB

ENGINE DATA ****************************************************************************************

     CAL ID NUMBER:     7    ENGINE TYPE AND MODEL:  T56-A7B                    SERIAL NUMBER:    AE-101889

                             RATED HORSEPOWER:      3755.

     ENGINE TOTAL TIME:                                 8488. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          0. HRS
          N2 COMPRESSOR OVERHAUL:                         -0. HRS
          COMBUSTOR CAN REPLACEMENT:                       0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
          N1 TURBINE OVERHAUL:                             0. HRS
          N2 TURBINE OVERHAUL:                            -0. HRS

     FUEL: JP-4                 FUEL H/C RATIO:   1.995

OPERATIONAL DATA ***********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    83.00    FINISH    83.00

     ATMOSPHERIC PRESSURE:              START    29.01    FINISH    29.01

     INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0199

     RELATIVE HUMIDITY:                        72.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    0.50

NUMBER OF TESTS:   8

COMMENTS:

F/A CALCULATION BASED ON EXHAUST COMPOSITION FOR 2ND LAST RUN


 ELAPSED    TEST           POWER                 ENGINE              MEASURED   GAS GEN     CALC      COMPRESSOR    ENGINE      TURBINE
  TIME      MODE     THRUST,LBS  PERCENT          SPEED                FUEL     AIR FLOW    F/A       DISCHARGE    PRESSURE      INLET
                         OR       RATED            RPM                 FLOW     LB/SEC                   TEMP        RATIO        TEMP
                        SHP       T.O.       N1            N2          LB/HR                          DEGREES F      EPR      DEGREES F

    0.0     1/ 0      2281.00       60    13800.00       -0.00       1480.00     30.60    0.013400      -0.00       -0.00      1510.00
    7.35    2/ 1      3180.00       84    13800.00       -0.00       1825.00     30.60    0.016600      -0.00       -0.00      1710.00
   13.35    3/ 2      3487.00       92    13800.00       -0.00       1960.00     30.60    0.017800      -0.00       -0.00      1780.00
   19.35    4/ 3       840.00       22    13240.00       -0.00        890.00     28.20    0.008800      -0.00       -0.00      1164.00
   21.37    5/ 4      3510.00       93    14260.00       -0.00       1975.00     32.40    0.016900      -0.00       -0.00      1858.00
   22.15    6/ 5       820.00       21    13250.00       -0.00        895.00     28.20    0.008800      -0.00       -0.00      1164.00
   23.15    7/ 6       118.00        3     9910.00       -0.00        575.00     14.60    0.010900      -0.00       -0.00      1130.00
   24.50    8/ 7       328.00        8    13330.00       -0.00        745.00     28.60    0.007200      -0.00       -0.00      1055.00


 POWER     EXHAUST      EXHAUST           CO         CO        THC       NO        NO         NO      ALDEHYDES   SMOKE   PARTICULATES
PERCENT      GAS          GAS           (WET)        2       (WET)     (WET)       2          X
 RATED       TEMP       PRESSURE         PPMV      (WET)      PPMV      PPMV     (WET)      (WET)
 T.O.     DEGREES F       PSIA                   PERCENT V                        PPMV       PPMV

  60        -0.00        -0.00          27.00      2.53      43.00     60.00      7.00      67.00     -0.00      -0.00      -0.00
  84        -0.00        -0.00          26.00      3.16      41.00     83.00      7.00      90.00     -0.00      -0.00      -0.00
  92        -0.00        -0.00          24.00      3.42       4.10     93.00      6.00      99.00     -0.00      -0.00      -0.00
  22        -0.00        -0.00          29.00      1.71      41.00      0.0       0.0       32.00     -0.00      -0.00      -0.00
  93        -0.00        -0.00          25.00      3.76      42.00      0.0       0.0      100.00     -0.00      -0.00      -0.00
  21        -0.00        -0.00          29.00      1.71      42.00      0.0       0.0       31.00     -0.00      -0.00      -0.00
   3        -0.00        -0.00         299.00      2.15     250.00      9.00     16.00      25.00     -0.00      -0.00      -0.00
   8        -0.00        -0.00          32.00      1.40      45.00      0.0       0.0       25.00     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  60        2.13      1.94      0.91    3130.21     7.76      8.67      3.15      2.87      1.34    4632.71     11.49     12.83
  84        1.64      1.48      0.73    3132.23     8.60      9.33      2.99      2.70      1.32    5716.32     15.70     17.02
  92        1.40      0.14      0.58    3136.30     8.92      9.49      2.75      0.27      1.13    6147.14     17.47     18.60
  22        3.37      2.73      0.0     3126.08     0.0       6.12      3.00      2.43      0.0     2782.21      0.0       5.44
  93        1.33      1.28      0.0     3133.29     0.0       8.71      2.62      2.52      0.0     6188.24      0.0      17.21
  21        3.37      2.80      0.0     3125.89     0.0       5.92      3.02      2.50      0.0     2797.68      0.0       5.30
   3       27.99     12.97      2.38    3060.72     1.34      3.72     15.58      7.46      1.37    1759.91      0.77      2.14
   8        4.54      3.66      0.0     3121.71     0.0       5.83      3.38      2.72      0.0     2325.67      0.0       4.34


 POWER           CO               CO              THC              NO              NO              NO
PERCENT                            2                                                2               X
 RATED     LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR
 T.O.

  60             1.379         2031.000          1.258           5.035           0.587           5.623
  84             0.941         1797.585          0.850           4.936           0.416           5.352
  92             0.787         1762.873          0.077           5.011           0.323           5.335
  22             3.575         3312.153          2.895           0.0             0.0             6.480
  93             0.746         1763.032          0.718           0.0             0.0             4.902
  21             3.683         3411.800          3.055           0.0             0.0             6.466
   3           132.009        14914.516         63.215           6.527          11.603          18.130
   8            10.315         7090.457          8.307           0.0             0.0            13.236
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     CAL ID NUMBER:    7   ENGINE TYPE AND MODEL: T56-A7B               SERIAL NUMBER:   AE-101889

TEST ORGANIZATION:  S W R I KELLY


   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /    ENERGY   LB CO /
             POWER        HP       RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   HP-HR     HP-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.030       112.6    14.701    427.346     1.000       19.00      4.655     135.33     34.400     35.67    0.13050
TAKEOFF     1.000      3755.0     2.436   2070.004     1.000        0.50      0.020      17.25      1.177     31.29    0.00065
CLIMBOUT    0.900      3379.5     2.752   1920.723     1.000        2.50      0.115      80.03      1.433    140.81    0.00081
APPROACH    0.300      1126.5     3.251   1063.044     1.000        4.50      0.244      79.73      3.058     84.49    0.00289
TAXI-IDLE   0.030       112.6    14.701    427.346     1.000        7.00      1.715      49.86     34.400     13.14    0.13050

                                 TOTAL FOR CYCLE:                             6.749     362.19                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             18.634
                                 LBS POLLUTANT/1K HP-HR/CYCLE:               22.099
                                 LBS POLLUTANT/1000K HP AT T.O.:              0.541


   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /    ENERGY   LB HC /
             POWER        HP       RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   HP-HR     HP-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.030       112.6     6.051    427.346     1.000       19.00      1.916     135.33     14.160     35.67    0.05372
TAKEOFF     1.000      3755.0     1.637   2070.004     1.000        0.50      0.014      17.25      0.791     31.29    0.00044
CLIMBOUT    0.900      3379.5     2.091   1920.723     1.000        2.50      0.087      80.03      1.089    140.81    0.00062
APPROACH    0.300      1126.5     2.694   1063.044     1.000        4.50      0.202      79.73      2.535     84.49    0.00239
TAXI-IDLE   0.030       112.6     6.051    427.346     1.000        7.00      0.706      49.86     14.160     13.14    0.05372

                                 TOTAL FOR CYCLE:                             2.925     362.19                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              8.076
                                 LBS POLLUTANT/1K HP-HR/CYCLE:                9.577
                                 LBS POLLUTANT/1000K HP AT T.O.:              3.634


   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/    ENERGY   LB NOX/
             POWER        HP       RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   HP-HR     HP-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.030       112.6     1.519    427.346     1.000       19.00      0.481     135.33      3.554     35.67    0.01348
TAKEOFF     1.000      3755.0    19.138   2070.004     1.000        0.50      0.159      17.25      9.245     31.29    0.00510
CLIMBOUT    0.900      3379.5    17.872   1920.723     1.000        2.50      0.745      80.03      9.305    140.81    0.00529
APPROACH    0.300      1126.5     7.004   1063.044     1.000        4.50      0.525      79.73      6.589     84.49    0.00622
TAXI-IDLE   0.030       112.6     1.519    427.346     1.000        7.00      0.177      49.86      3.554     13.14    0.01348

                                 TOTAL FOR CYCLE:                             2.088     362.19                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              5.764
                                 LBS POLLUTANT/1K HP-HR/CYCLE:                6.836
                                 LBS POLLUTANT/1000K HP AT T.O.:             42.471
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DATE:   6/22/71

TEST ORGANIZATION:  S W R I KELLY

ENGINE SUPPLIER:    USAF, KELLY AFB

ENGINE DATA ********************************************************************************************

    CAL ID NUMBER:    8    ENGINE TYPE AND MODEL:  T56-A7B                    SERIAL NUMBER:    AE-101743

                           RATED HORSEPOWER:      3755.

    ENGINE TOTAL TIME:                             7032. HRS

    TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                      0. HRS
         N2 COMPRESSOR OVERHAUL:                     -0. HRS
         COMBUSTOR CAN REPLACEMENT:                   0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
         N1 TURBINE OVERHAUL:                         0. HRS
         N2 TURBINE OVERHAUL:                        -0. HRS

    FUEL: JP-4                  FUEL H/C RATIO:   1.995

OPERATIONAL DATA ***************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   90.00   FINISH   90.00

     ATMOSPHERIC PRESSURE:              START   29.08   FINISH   29.08

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0164

     RELATIVE HUMIDITY:                      49.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    0.50

NUMBER OF TESTS:   8

COMMENTS:

F/A CALCULATION BASED ON EXHAUST FOR LAST RUN


                                                                                                           COMPRESSOR   ENGINE     TURBINE
 ELAPSED   TEST          POWER                ENGINE                MEASURED   GAS GEN      CALC       DISCHARGE    PRESSURE    INLET
  TIME     MODE   THRUST,LBS  PERCENT          SPEED                  FUEL     AIR FLOW     F/A          TEMP       RATIO       TEMP
                     OR        RATED            RPM                   FLOW      LB/SEC               DEGREES F     EPR      DEGREES F
                     SHP       T.O.        N1            N2           LB/HR

   0.0     1/ 0    2105.00      56     13800.00      -0.00       1410.00     30.10     0.013000      -0.00        -0.00      1505.00
   7.00    2/ 1    3004.00      79     13800.00      -0.00       1755.00     30.10     0.016200      -0.00        -0.00      1710.00
  12.00    3/ 2    3355.00      89     13800.00      -0.00       1880.00     30.10     0.017300      -0.00        -0.00      1780.00
  15.00    4/ 3     840.00      22     13240.00      -0.00        905.00     27.80     0.009000      -0.00        -0.00      1206.00
  17.52    5/ 4    3533.00      94     14000.00      -0.00       1910.00     30.90     0.017200      -0.00        -0.00      1900.00
  19.30    4/ 5     676.00      18     13300.00      -0.00        845.00     28.00     0.008400      -0.00        -0.00      1152.00
  21.00    8/ 4     404.00      10     13400.00      -0.00        765.00     28.40     0.007500      -0.00        -0.00      1094.00
  23.00    7/ 8     142.00       3      9930.00      -0.00        585.00     15.30     0.010600      -0.00        -0.00      1178.00


                                                                                   NO      ALDEHYDES   SMOKE   PARTICULATES
 POWER     EXHAUST      EXHAUST       CO         CO        THC       NO      NO       X
PERCENT      GAS          GAS        (WET)        2       (WET)    (WET)      2     (WET)
 RATED      TEMP       PRESSURE      PPMV      (WET)      PPMV     PPMV    (WET)    PPMV
  T.O.    DEGREES F      PSIA                PERCENT V                      PPMV

   56       -0.00        -0.00       34.00      2.35      0.0      71.00    8.00    79.00    -0.00      -0.00     -0.00
   79       -0.00        -0.00       34.00      2.35      0.0      71.00    8.00    79.00    -0.00      -0.00     -0.00
   89       -0.00        -0.00       13.00      3.20      0.0     113.00    5.00   118.00    -0.00      -0.00     -0.00
   22       -0.00        -0.00       14.00      1.67      0.0      27.00   10.00    37.00    -0.00      -0.00     -0.00
   94       -0.00        -0.00       10.00      3.60      0.0       0.0     0.0    119.00    -0.00      -0.00     -0.00
   18       -0.00        -0.00       13.00      1.55      0.0       0.0     0.0     32.00    -0.00      -0.00     -0.00
   10       -0.00        -0.00       13.00      1.38      0.0       0.0     0.0     28.00    -0.00      -0.00     -0.00
    3       -0.00        -0.00      269.00      2.14    215.00     12.00   16.00    28.00    -0.00      -0.00     -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2        CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR      LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   56       2.89      0.0       1.12    3134.34     9.90     11.02      4.07      0.0       1.57    4419.41    13.96     15.53
   79       2.89      0.0       1.12    3134.34     9.90     11.02      5.07      0.0       1.96    5500.76    17.37     19.33
   89       0.81      0.0       0.51    3137.60    11.58     12.10      1.53      0.0       0.96    5898.68    21.78     22.74
   22       1.67      0.0       1.96    3136.24     5.30      7.26      1.51      0.0       1.78    2838.30     4.80      6.57
   94       0.55      0.0       0.0     3138.00     0.0      10.84      1.06      0.0       0.0     5993.58     0.0      20.71
   18       1.67      0.0       0.0     3136.24     0.0       6.77      1.41      0.0       0.0     2650.13     0.0       5.72
   10       1.88      0.0       0.0     3135.92     0.0       6.65      1.44      0.0       0.0     2398.98     0.0       5.09
    3      24.56     11.24      2.40    3069.45     1.80      4.20     14.37      6.58      1.40    1795.63     1.05      2.46


                                                                                  NO               NO
 POWER          CO              CO              THC              NO                2                X
PERCENT                          2
 RATED     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR
  T.O.

   56          1.933        2099.484          0.0             6.631            0.747            7.378
   79          1.686        1831.145          0.0             5.784            0.652            6.435
   89          0.455        1758.175          0.0             6.490            0.287            6.778
   22          1.803        3378.927          0.0             5.711            2.115            7.826
   94          0.300        1696.456          0.0             0.0              0.0              5.862
   18          2.093        3920.303          0.0             0.0              0.0              8.461
   10          3.560        5938.063          0.0             0.0              0.0             12.595
    3        101.165       12645.273         46.308           7.413            9.884           17.296
    CAL ID NUMBER:    8   ENGINE TYPE AND MODEL: T56-A7B              SERIAL NUMBER:   AE-101743

TEST ORGANIZATION:  S W R I KELLY

   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY    LB CO /
             POWER        HP       RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL    HP-HR      HP-HR
                                   LB/HR     LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.030       112.6    16.345     470.568    1.000      19.00     5.176      149.01     34.735      35.67     0.14510
TAKEOFF     1.000      3755.0     0.0      1960.124    1.000       0.50     0.0         16.33      0.0        31.29     0.0
CLIMBOUT    0.900      3379.5     2.413    1864.996    1.000       2.50     0.101       77.71      1.294     140.81     0.00071
APPROACH    0.300      1126.5     2.007    1039.307    1.000       4.50     0.151       77.95      1.931      84.49     0.00178
TAXI-IDLE   0.030       112.6    16.345     470.568    1.000       7.00     1.907       54.90     34.735      13.14     0.14510

                                TOTAL FOR CYCLE:                            7.334      375.90                305.41
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            19.510
                                LBS POLLUTANT/1K HP-HR/CYCLE:              24.014
                                LBS POLLUTANT/1000K HP AT T.O.:             0.0


   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY    LB HC /
             POWER        HP       RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL    HP-HR      HP-HR
                                   LB/HR     LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.030       112.6     7.052     470.568    1.000      19.00     2.233      149.01     14.987      35.67     0.06260
TAKEOFF     1.000      3755.0     0.0      1960.124    1.000       0.50     0.0         16.33      0.0        31.29     0.0
CLIMBOUT    0.900      3379.5     0.009    1864.996    1.000       2.50     0.000       77.71      0.005     140.81     0.00000
APPROACH    0.300      1126.5     0.047    1039.307    1.000       4.50     0.004       77.95      0.045      84.49     0.00004
TAXI-IDLE   0.030       112.6     7.052     470.568    1.000       7.00     0.823       54.90     14.987      13.14     0.06260

                                TOTAL FOR CYCLE:                            3.060      375.90                305.41
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             8.140
                                LBS POLLUTANT/1K HP-HR/CYCLE:              10.019
                                LBS POLLUTANT/1000K HP AT T.O.:             0.0


   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY    LB NOX/
             POWER        HP       RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL    HP-HR      HP-HR
                                   LB/HR     LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.030       112.6     1.652     470.568    1.000      19.00     0.523      149.01      3.511      35.67     0.01467
TAKEOFF     1.000      3755.0    21.094    1960.124    1.000       0.50     0.176       16.33     10.761      31.29     0.00562
CLIMBOUT    0.900      3379.5    20.368    1864.996    1.000       2.50     0.849       77.71     10.921     140.81     0.00603
APPROACH    0.300      1126.5     8.484    1039.307    1.000       4.50     0.636       77.95      8.163      84.49     0.00753
TAXI-IDLE   0.030       112.6     1.652     470.568    1.000       7.00     0.193       54.90      3.511      13.14     0.01467

                                TOTAL FOR CYCLE:                            2.377      375.90                305.41
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             6.323
                                LBS POLLUTANT/1K HP-HR/CYCLE:               7.782
                                LBS POLLUTANT/1000K HP AT T.O.:            46.812
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DATE: 6/23/71

TEST ORGANIZATION: S W R I KELLY

ENGINE SUPPLIER: USAF, KELLY AFB

ENGINE DATA **

CAL ID NUMBER: 9 ENGINE TYPE AND MODEL: T56-A7B SERIAL NUMBER: AE-101695

RATED HORSEPOWER: 3755.

ENGINE TOTAL TIME: 4828. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 0. HRS
N2 COMPRESSOR OVERHAUL: -0. HRS
COMBUSTOR CAN REPLACEMENT: 0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 0. HRS
N1 TURBINE OVERHAUL: 0. HRS
N2 TURBINE OVERHAUL: -0. HRS

FUEL: JP-4 FUEL H/C RATIO: 0.995

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 85.00 FINISH 85.00

ATMOSPHERIC PRESSURE: START 29.12 FINISH 29.12

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0170

RELATIVE HUMIDITY: 58.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 0.50

NUMBER OF TESTS: 9

COMMENTS:

F/A CALCULATION BASED ON EXHAUST COMPOSITION FOR LAST THREE RUNS

ELAPSED TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	1/ 0	2237.00	59	13800.00	-0.00	1450.00	30.50	0.013200	-0.00	-0.00	1505.00
5.00	2/ 1	3114.00	82	13800.00	-0.00	1795.00	30.50	0.016300	-0.00	-0.00	1710.00
10.00	3/ 2	3443.00	91	13800.00	-0.00	1930.00	30.50	0.017600	-0.00	-0.00	1775.00
15.30	4/ 3	651.00	17	13230.00	-0.00	815.00	28.00	0.008100	-0.00	-0.00	1132.00
17.00	5/ 4	3548.00	94	13800.00	-0.00	1945.00	30.50	0.017700	-0.00	-0.00	1760.00
18.30	6/ 5	363.00	9	13430.00	-0.00	750.00	28.90	0.007200	-0.00	-0.00	1080.00
20.30	7/ 6	126.00	3	9.92	-0.00	565.00	14.90	0.010500	-0.00	-0.00	1152.00
22.00	7/ 7	126.00	3	9.91	-0.00	580.00	15.00	0.010700	-0.00	-0.00	1150.00
29.30	7/ 7	126.00	3	9.90	-0.00	570.00	14.60	0.010900	-0.00	-0.00	1150.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
59	-0.00	-0.00	42.00	2.44	4.00	71.00	7.00	78.00	-0.00	-0.00	-0.00
82	-0.00	-0.00	35.00	3.07	4.00	103.00	5.00	108.00	-0.00	-0.00	-0.00
91	-0.00	-0.00	30.00	3.29	2.00	109.00	5.00	114.00	-0.00	-0.00	-0.00
17	-0.00	-0.00	30.00	1.67	3.00	28.00	4.00	32.00	-0.00	-0.00	-0.00
94	-0.00	-0.00	29.00	3.38	3.00	0.0	0.0	117.00	-0.00	-0.00	-0.00
9	-0.00	-0.00	31.00	1.46	4.00	23.00	5.00	28.00	-0.00	-0.00	-0.00
3	-0.00	-0.00	261.00	2.12	162.00	13.00	16.00	29.00	-0.00	-0.00	-0.00
3	-0.00	-0.00	270.00	2.16	175.00	12.00	17.00	29.00	-0.00	-0.00	-0.00
3	-0.00	-0.00	270.00	2.19	171.00	12.00	17.00	29.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
59	3.70	0.20	1.01	3375.65	10.27	11.28	5.36	0.29	1.47	4894.69	14.89	16.36
82	2.45	0.16	0.58	3377.72	11.85	12.42	4.40	0.29	1.03	6063.00	21.27	22.30
91	1.97	0.08	0.54	3378.72	11.74	12.28	3.80	0.14	1.04	6520.92	22.65	23.69
17	3.86	0.22	0.85	3375.34	5.92	6.76	3.15	0.18	0.69	2750.91	4.82	5.51
94	1.85	0.11	0.0	3378.81	0.0	12.23	3.59	0.21	0.0	6571.79	0.0	23.78
9	4.56	0.34	1.21	3373.93	5.56	6.76	3.42	0.25	0.91	2530.45	4.17	5.07
3	25.98	9.24	2.62	3315.85	2.13	4.74	14.68	5.22	1.48	1873.46	1.20	2.68
3	26.36	9.79	2.73	3313.75	1.92	4.65	15.29	5.68	1.58	1921.97	1.12	2.70
3	26.01	9.44	2.69	3315.25	1.90	4.59	14.83	5.38	1.53	1889.70	1.08	2.62

POWER PERCENT RATED T.O.	CO LB/1K HP-HR	CO_2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO_2 LB/1K HP-HR	NO_x LB/1K HP-HR
59	2.397	2186.059	0.131	6.656	0.656	7.312
82	1.413	1947.015	0.092	6.829	0.331	7.160
91	1.103	1893.966	0.042	6.580	0.302	6.882
17	4.831	4225.660	0.277	7.407	1.058	8.465
94	1.011	1852.253	0.060	0.0	0.0	6.703
9	9.420	4970.926	0.696	11.480	2.496	13.976
3	116.504	14868.703	41.415	9.532	11.731	21.263
3	121.352	15253.746	45.047	8.859	12.550	21.409
3	117.680	14997.578	42.685	8.591	12.170	20.761

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    CAL ID NUMBER:    9   ENGINE TYPE AND MODEL: T56-A7B                      SERIAL NUMBER:   AE-101695

TEST ORGANIZATION:  S W R I KELLY

   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN      CO          FUEL    LB CO /     ENERGY   LB CO /
             POWER        HP       RATE       RATE     WT FACTOR    MODE      MASS         MASS   1K LB FUEL   HP-HR     HP-HR
                                   LB/HR      LB/HR                 MIN.      LBS.         LBS.

TAXI-IDLE   0.030       112.6    14.147     540.310     1.000      19.00     4.480       171.10     26.184      35.67   0.12559
TAKEOFF     1.000      3755.0     2.680    2016.737     1.000       0.50     0.022        16.81      1.329      31.29   0.00071
CLIMBOUT    0.900      3379.5     3.626    1893.884     1.000       2.50     0.151        78.91      1.915     140.81   0.00107
APPROACH    0.300      1126.5     4.214    1046.024     1.000       4.50     0.316        78.45      4.028      84.49   0.00374
TAXI-IDLE   0.030       112.6    14.147     540.310     1.000       7.00     1.651        63.04     26.184      13.14   0.12559

                                 TOTAL FOR CYCLE:                            6.620       408.30                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            16.213
                                 LBS POLLUTANT/1K HP-HR/CYCLE:              21.676
                                 LBS POLLUTANT/1000K HP AT T.O.:             0.595

   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN      HC          FUEL    LB HC /     ENERGY   LB HC /
             POWER        HP       RATE       RATE     WT FACTOR    MODE      MASS         MASS   1K LB FUEL   HP-HR     HP-HR
                                   LB/HR      LB/HR                 MIN.      LBS.         LBS.

TAXI-IDLE   0.030       112.6     4.685     540.310     1.000      19.00     1.483       171.10      8.670      35.67   0.04159
TAKEOFF     1.000      3755.0     0.139    2016.737     1.000       0.50     0.001        16.81      0.069      31.29   0.00004
CLIMBOUT    0.900      3379.5     0.161    1893.884     1.000       2.50     0.007        78.91      0.085     140.81   0.00005
APPROACH    0.300      1126.5     0.171    1046.024     1.000       4.50     0.013        78.45      0.163      84.49   0.00015
TAXI-IDLE   0.030       112.6     4.685     540.310     1.000       7.00     0.547        63.04      8.670      13.14   0.04159

                                 TOTAL FOR CYCLE:                            2.051       408.30                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             5.022
                                 LBS POLLUTANT/1K HP-HR/CYCLE:               6.715
                                 LBS POLLUTANT/1000K HP AT T.O.:             0.309

   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN     NOX          FUEL    LB NOX/     ENERGY   LB NOX/
             POWER        HP       RATE       RATE     WT FACTOR    MODE      MASS         MASS   1K LB FUEL   HP-HR     HP-HR
                                   LB/HR      LB/HR                 MIN.      LBS.         LBS.

TAXI-IDLE   0.030       112.6     2.537     540.310     1.000      19.00     0.803       171.10      4.695      35.67   0.02252
TAKEOFF     1.000      3755.0    24.308    2016.737     1.000       0.50     0.203        16.81     12.053      31.29   0.00647
CLIMBOUT    0.900      3379.5    23.462    1893.884     1.000       2.50     0.978        78.91     12.388     140.81   0.00694
APPROACH    0.300      1126.5     8.528    1046.024     1.000       4.50     0.640        78.45      8.152      84.49   0.00757
TAXI-IDLE   0.030       112.6     2.537     540.310     1.000       7.00     0.296        63.04      4.695      13.14   0.02252

                                 TOTAL FOR CYCLE:                            2.919       408.30                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             7.149
                                 LBS POLLUTANT/1K HP-HR/CYCLE:               9.558
                                 LBS POLLUTANT/1000K HP AT T.O.:            53.945
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DATE:   6/23/71

TEST ORGANIZATION:  S W R I KELLY

ENGINE SUPPLIER:    USAF, KELLY AFB

ENGINE DATA ************************************************************************************************************

     CAL ID NUMBER:   10    ENGINE TYPE AND MODEL:  T56-A7B                   SERIAL NUMBER:    AF-104192

                            RATED HORSEPOWER:     3755.

     ENGINE TOTAL TIME:                              5381. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      0. HRS
          N2 COMPRESSOR OVERHAUL:                     -0. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
          N1 TURBINE OVERHAUL:                         0. HRS
          N2 TURBINE OVERHAUL:                        -0. HRS

     FUEL: JP-4                FUEL H/C RATIO:   1.995

OPERATIONAL DATA ***************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   93.00   FINISH   94.00

     ATMOSPHERIC PRESSURE:              START   29.05   FINISH   29.05

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0127

     RELATIVE HUMIDITY:                 37.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    0.50

NUMBER OF TESTS:   8

COMMENTS:

F/A CALCULATION BASED ON EXHAUST COMPOSITION FOR LAST RUN


                                                                                               COMPRESSOR    ENGINE     TURBINE
                            POWER                 ENGINE            MEASURED  GAS GEN    CALC   DISCHARGE   PRESSURE     INLET
ELAPSED   TEST     THRUST,LBS  PERCENT            SPEED               FUEL    AIR FLOW   F/A      TEMP       RATIO       TEMP
 TIME     MODE         OR       RATED              RPM                FLOW    LB/SEC           DEGREES F     EPR      DEGREES F
                      SHP       T.O.        N1            N2          LB/HR

   0.0    1/ 0      2083.00      55     13900.00       -0.00       1405.00     29.90   0.013100    -0.00      -0.00     1508.00
   5.00   2/ 1      2939.00      78     13980.00       -0.00       1740.00     29.90   0.016200    -0.00      -0.00     1710.00
  10.00   3/ 2      3216.00      85     13900.00       -0.00       1860.00     29.90   0.017300    -0.00      -0.00     1782.00
  15.30   4/ 3       720.00      19     13340.00       -0.00        860.00     28.00   0.008500    -0.00      -0.00     1180.00
  17.15   5/ 4      3458.00      92     14320.00       -0.00       1980.00     32.10   0.017100    -0.00      -0.00     1852.00
  18.45   6/ 5       721.00      19     13350.00       -0.00        860.00     28.00   0.008500    -0.00      -0.00     1178.00
  19.30   8/ 6       236.00       6     13490.00       -0.00        715.00     28.60   0.006900    -0.00      -0.00     1076.00
  22.00   7/ 8        63.00       1      9990.00       -0.00        565.00     15.20   0.010300    -0.00      -0.00     1170.00


                                                                      NO        NO        NO    ALDEHYDES   SMOKE   PARTICULATES
 POWER    EXHAUST     EXHAUST        CO         CO        THC                   2         X
PERCENT     GAS         GAS        (WET)         2       (WET)     (WET)     (WET)     (WET)
 RATED     TEMP      PRESSURE       PPMV      (WET)      PPMV      PPMV      PPMV      PPMV
 T.O.    DEGREES F     PSIA                 PERCENT V

   55      -0.00       -0.00       44.00      2.39       0.0      73.00      8.00     81.00     -0.00      -0.00      -0.00
   78      -0.00       -0.00       29.00      3.02       0.0     110.00      6.00    116.00     -0.00      -0.00      -0.00
   85      -0.00       -0.00       24.00      3.22       0.0     119.00      7.00    126.00     -0.00      -0.00      -0.00
   19      -0.00       -0.00       28.00      1.66       0.0       0.0       0.0      39.00     -0.00      -0.00      -0.00
   92      -0.00       -0.00       22.00      1.52       0.0       0.0       0.0     128.00     -0.00      -0.00      -0.00
   19      -0.00       -0.00       26.00      1.59       0.0       0.0       0.0      35.00     -0.00      -0.00      -0.00
    6      -0.00       -0.00       24.00      1.33       0.0       0.0       0.0      29.00     -0.00      -0.00      -0.00
    1      -0.00       -0.00      312.00      2.10     270.00      0.0       0.0      31.00     -0.00      -0.00      -0.00


                                                                      MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI     CO        HC        NO2       CO2       NO        NOX
PERCENT      CO        HC       NO2       CO2        NO       NOX      LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   55       3.57      0.0       1.10    3133.10    10.00     11.10      5.16      0.0       1.54    4402.01    14.06     15.60
   78       1.92      0.0       0.65    3135.86    11.94     12.59      3.33      0.0       1.13    5456.39    20.78     21.91
   85       1.49      0.0       0.71    3136.53    12.12     12.83      2.77      0.0       1.33    5833.95    22.54     23.86
   19       3.36      0.0       0.0     3133.59     0.0       7.70      2.89      0.0       0.0     2694.[illegible]     0.0        6.62
   92       1.25      0.0       0.0     3136.91     0.0      11.92      2.47      0.0       0.0     6211.08     0.0       23.61
   19       3.26      0.0       0.0     3133.75     0.0       7.21      2.80      0.0       0.0     2695.02     0.0        6.20
    6       3.60      0.0       0.0     3133.22     0.0       7.14      2.57      0.0       0.0     2240.25     0.0        5.11
    1      28.88     14.31      0.0     3054.23     0.0       4.71     16.32      8.09      0.0     1725.64     0.0        2.66


                                                                                           NO
 POWER                           CO             THC              NO            NO           X
PERCENT       CO                  2                                             2
 RATED                                     LB/1K HP-HR     LB/1K HP-HR    LB/1K HP-HR   LB/1K HP-HR
 T.O.    LB/1K HP-HR        LB/1K HP-HR

   55       2.476           2113.302           0.0            6.749          0.739         7.487
   78       1.135           1856.548           0.0            7.069          0.386         7.455
   85       0.861           1814.040           0.0            7.008          0.412         7.421
   19       4.018           3742.895           0.0            0.0            0.0           9.193
   92       0.714           1796.149           0.0            0.0            0.0           6.828
   19       3.890           3737.895           0.0            0.0            0.0           8.602
    6      10.902           9492.598           0.0            0.0            0.0          21.638
    1     259.004          27391.109         128.369          0.0            0.0          42.270
    CAL ID NUMBER:   10   ENGINE TYPE AND MODEL: T56-A7B                SERIAL NUMBER:   AE-104192

TEST ORGANIZATION:  S W R I KELLY


   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /      ENERGY   LB CO /
             POWER        HP       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL     HP-HR     HP-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.030       112.6     9.139     588.560     1.000      19.00      2.894     186.38     15.527       35.67    0.08112
TAKEOFF     1.000      3755.0     1.700    2160.290     1.000       0.50      0.014      18.00      0.787       31.29    0.00045
CLIMBOUT    0.900      3379.5     2.475    1941.074     1.000       2.50      0.103      80.88      1.275      140.81    0.00073
APPROACH    0.300      1126.5     3.811    1068.830     1.000       4.50      0.286      80.16      3.565       84.49    0.00338
TAXI-IDLE   0.030       112.6     9.139     588.560     1.000       7.00      1.066      68.67     15.527       13.14    0.08112

                                 TOTAL FOR CYCLE:                             4.363     434.09                 305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             10.051
                                 LBS POLLUTANT/1K HP-HR/CYCLE:               14.286
                                 LBS POLLUTANT/1000K HP AT T.O.:              0.377


   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /      ENERGY   LB HC /
             POWER        HP       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL     HP-HR     HP-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.030       112.6     3.138     588.560     1.000      19.00      0.994     186.38      5.332       35.67    0.02786
TAKEOFF     1.000      3755.0     0.0      2160.290     1.000       0.50      0.0        18.00      0.0         31.29    0.0
CLIMBOUT    0.900      3379.5     0.002    1941.074     1.000       2.50      0.000      80.88      0.001      140.81    0.00000
APPROACH    0.300      1126.5     0.019    1068.830     1.000       4.50      0.001      80.16      0.018       84.49    0.00002
TAXI-IDLE   0.030       112.6     3.138     588.560     1.000       7.00      0.366      68.67      5.332       13.14    0.02786

                                 TOTAL FOR CYCLE:                             1.361     434.09                 305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              3.136
                                 LBS POLLUTANT/1K HP-HR/CYCLE:                4.458
                                 LBS POLLUTANT/1000K HP AT T.O.:              0.0


   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/      ENERGY   LB NOX/
             POWER        HP       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL     HP-HR     HP-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.030       112.6     2.889     588.560     1.000      19.00      0.915     186.38      4.909       35.67    0.02565
TAKEOFF     1.000      3755.0    30.241    2160.290     1.000       0.50      0.252      18.00     13.998       31.29    0.00805
CLIMBOUT    0.900      3379.5    25.268    1941.074     1.000       2.50      1.053      80.88     13.018      140.81    0.00748
APPROACH    0.300      1126.5     9.101    1068.830     1.000       4.50      0.683      80.16      8.515       84.49    0.00808
TAXI-IDLE   0.030       112.6     2.889     588.560     1.000       7.00      0.337      68.67      4.909       13.14    0.02565

                                 TOTAL FOR CYCLE:                             3.239     434.09                 305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              7.463
                                 LBS POLLUTANT/1K HP-HR/CYCLE:               10.607
                                 LBS POLLUTANT/1000K HP AT T.O.:             67.112
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DATE:   6/24/71

TEST ORGANIZATION:  S W R I KELLY

ENGINE SUPPLIER:    USAF, KELLY AFB

ENGINE DATA ***********************************************************************************************
                                                                          SERIAL NUMBER:      AE-103202
     CAL ID NUMBER:    13     ENGINE TYPE AND MODEL:  T56-A7B

                             RATED HORSEPOWER:       3755.

      ENGINE TOTAL TIME:                                  4879. HRS

      TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

      TIME SINCE:

           N1 COMPRESSOR OVERHAUL:                          0. HRS
           N2 COMPRESSOR OVERHAUL:                         -0. HRS
           COMBUSTOR CAN REPLACEMENT:                       0. HRS
           FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
           N1 TURBINE OVERHAUL:                             0. HRS
           N2 TURBINE OVERHAUL:                            -0. HRS

      FUEL: JP-4                  FUEL H/C RATIO:    1.995

 OPERATIONAL DATA *********************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START    82.00    FINISH    81.00

      ATMOSPHERIC PRESSURE:              START    29.12    FINISH    29.12

      INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0153

      RELATIVE HUMIDITY:                   48.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

      SAMPLE LINE TRANSPORT TIME, SEC:     0.50

  NUMBER OF TESTS:    8

  COMMENTS:

  F/A CALCULATION BASED ON EXHAUST COMPOSITION FOR LAST RUN

                                                                                                                   TURBINE
                                                                                               ENGINE               INLET
                                                       MEASURED    GAS GEN     CALC   COMPRESSOR  PRESSURE             TEMP
                       POWER            ENGINE           FUEL      AIR FLOW    F/A    DISCHARGE    RATIO            DEGREES F
 ELAPSED   TEST   THRUST,LBS  PERCENT   SPEED            FLOW      LB/SEC               TEMP       EPR
  TIME     MODE       OR       RATED     RPM             LB/HR                        DEGREES F
                     SHP       T.O.    N1         N2

   0.0     1/ 0    2281.00      60    1379.00    -0.00   1465.00    30.70   0.013300    -0.00      -0.00     1505.00
   4.30    2/ 1    3202.00      85   13800.00    -0.00   1820.00    30.70   0.016500    -0.00      -0.00     1710.00
   9.50    3/ 2    3465.00      92   13800.00    -0.00   1950.00    30.70   0.017600    -0.00      -0.00     1780.00
  15.30    4/ 3     504.00      13   13240.00    -0.00    790.00    28.30   0.007700    -0.00      -0.00     1100.00
  17.00    5/ 4    3710.00      98   14250.00    -0.00   2070.00    32.70   0.017600    -0.00      -0.00     1900.00
  18.45    4/ 5     442.00      11   13250.00    -0.00    770.00    28.30   0.007600    -0.00      -0.00     1082.00
  20.30    8/ 4     274.00       7   13300.00    -0.00    715.00    28.50   0.007000    -0.00      -0.00     1040.00
  21.30    7/ 8      79.00       2    9920.00    -0.00    555.00    15.30   0.010100    -0.00      -0.00     1124.00

                                                                             NO      ALDEHYDES   SMOKE   PARTICULATES
                                          CO        CO     THC     NO     NO      X
 POWER    EXHAUST     EXHAUST           (WET)        2    (WET)  (WET)     2   (WET)
 PERCENT    GAS         GAS              PPMV     (WET)    PPMV   PPMV  (WET)   PPMV
 RATED      TEMP      PRESSURE                  PERCENT V               PPMV
 T.O.    DEGREES F      PSIA

   60      -0.00       -0.00             49.00     2.53     0.0   78.00   9.00   87.00    -0.00      -0.00     -0.00
   85      -0.00       -0.00             38.00     3.11     0.0  109.00   9.00  118.00    -0.00      -0.00     -0.00
   92      -0.00       -0.00             32.00     3.31     0.0  118.00   8.00  126.00    -0.00      -0.00     -0.00
   13      -0.00       -0.00             36.00     1.51    4.00     0.0    0.0   32.00    -0.00      -0.00     -0.00
   98      -0.00       -0.00             31.00     3.45     0.0  117.00    0.0     0.0    -0.00      -0.00     -0.00
   11      -0.00       -0.00             35.00     1.43    4.00   23.00   7.00   30.00    -0.00      -0.00     -0.00
    7      -0.00       -0.00             35.00     1.34    4.00     0.0    0.0   27.00    -0.00      -0.00     -0.00
    2      -0.00       -0.00            279.00     2.04  232.00   13.00  17.00   30.00    -0.00      -0.00     -0.00

                                                                                                MASS EMI  MASS EMI  MASS EMI
 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI    CO2       NO       NOX
 PERCENT     CO        HC       NO2       CO2       NO        NOX        CO        HC       NO2      LB/HR     LB/HR     LB/HR
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   60       3.86      0.0       1.17    3132.80    10.10     11.26      5.66      0.0       1.71    4589.55    14.79     16.50
   85       2.44      0.0       0.95    3135.04    11.49     12.44      4.44      0.0       1.73    5705.77    20.91     22.63
   92       1.93      0.0       0.79    3135.84    11.69     12.48      3.76      0.0       1.55    6114.88    22.79     24.33
   13       4.75      0.30      0.0     3130.58     0.0       6.94      3.75      0.24      0.0     2473.16     0.0       5.48
   98       1.79      0.0       0.0     3136.05    11.12      0.0       3.71      0.0       0.0     6491.63    23.01      0.0
   11       4.88      0.32      1.60    3130.34     5.26      6.87      3.75      0.25      1.23    2410.36     4.05      5.29
    7       5.20      0.34      0.0     3129.76     0.0       6.59      3.72      0.24      0.0     2237.78     0.0       4.71
    2      26.65     12.69      2.67    3062.17     2.04      4.71     14.79      7.05      1.48    1699.50     1.13      2.61

                                                                                    NO
                                                                     NO              X
 POWER        CO               CO             THC           NO        2        LB/1K HP-HR
 PERCENT                        2                                LB/1K HP-HR
 RATED    LB/1K HP-HR      LB/1K HP-HR    LB/1K HP-HR   LB/1K HP-HR
 T.O.

   60         2.480          2012.081          0.0          6.485       0.748        7.233
   85         1.386          1781.[illegible]  0.0          6.529       0.539        7.068
   92         1.086          1764.757          0.0          6.577       0.446        7.023
   13         7.446          4907.059          0.474        0.0         0.0         10.871
   98         1.001          1749.766          0.0          6.203       0.0          0.0
   11         8.495          5453.297          0.556        9.169       2.791       11.960
    7        13.577          8167.086          0.889        0.0         0.0         17.203
    2       187.254         21512.723         89.178       14.331      18.741       33.073
    CAL ID NUMBER:   13   ENGINE TYPE AND MODEL: T56-A7B                    SERIAL NUMBER:   AE-103202

TEST ORGANIZATION:  S W R I KELLY

   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY    LB CO /
              POWER        HP      RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL     HP-HR     HP-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

                                                                   19.00      4.175     184.51     22.626      35.67    0.11703
TAXI-IDLE    0.030      112.6    13.183     582.649     1.000       0.50      0.029      17.43      1.660      31.29    0.00092
TAKEOFF      1.000     3755.0     3.472    2091.033     1.000       2.50      0.167      79.87      2.090     140.81    0.00119
CLIMBOUT     0.900     3379.5     4.006    1916.847     1.000       4.50      0.345      81.48      4.238      84.49    0.00409
APPROACH     0.300     1126.5     4.604    1086.378     1.000       7.00      1.538      67.98     22.626      13.14    0.11703
TAXI-IDLE    0.030      112.6    13.183     582.649     1.000
                                                                              6.254     431.25                305.41
                            TOTAL FOR CYCLE:                                 14.501
                            LBS POLLUTANT/1K LB FUEL/CYCLE:                  20.477
                            LBS POLLUTANT/1K HP-HR/CYCLE:                     0.770
                            LBS POLLUTANT/1000K HP AT T.O.:

   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY    LB HC /
              POWER        HP      RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL     HP-HR     HP-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

                                                                   19.00      1.665     184.51      9.025      35.67    0.04668
TAXI-IDLE    0.030      112.6     5.258     582.649     1.000       0.50      0.0        17.43      0.0        31.29    0.0
TAKEOFF      1.000     3755.0     0.0      2091.033     1.000       2.50      0.001      79.87      0.007     140.81    0.00000
CLIMBOUT     0.900     3379.5     0.013    1916.847     1.000       4.50      0.012      81.48      0.149      84.49    0.00014
APPROACH     0.300     1126.5     0.162    1086.378     1.000       7.00      0.613      67.98      9.025      13.14    0.04668
TAXI-IDLE    0.030      112.6     5.258     582.649     1.000
                                                                              2.291     431.25                305.41
                            TOTAL FOR CYCLE:                                  5.313
                            LBS POLLUTANT/1K LB FUEL/CYCLE:                   7.502
                            LBS POLLUTANT/1K HP-HR/CYCLE:                     0.0
                            LBS POLLUTANT/1000K HP AT T.O.:

   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY    LB NOX/
              POWER        HP      RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL     HP-HR     HP-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

                                                                   19.00      0.934     184.51      5.062      35.67    0.02618
TAXI-IDLE    0.030      112.6     2.949     582.649     1.000       0.50      0.220      17.43     12.641      31.29    0.00704
TAKFOFF      1.000     3755.0    26.433    2091.033     1.000       2.50      0.999      79.87     12.504     140.81    0.00709
CLIMBOUT     0.900     3379.5    23.969    1916.847     1.000       4.50      0.700      81.48      8.594      84.49    0.00829
APPROACH     0.300     1126.5     9.336    1086.378     1.000       7.00      0.344      67.98      5.062      13.14    0.02618
TAXI-IDLE    0.030      112.6     2.949     582.649     1.000
                                                                              3.197     431.25                305.41
                            TOTAL FOR CYCLE:                                  7.414
                            LBS POLLUTANT/1K LB FUEL/CYCLE:                  10.469
                            LBS POLLUTANT/1K HP-HR/CYCLF:                    58.661
                            LBS POLLUTANT/1000K HP AT T.O.:
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DATE:   6/24/71

TEST ORGANIZATION:  S W R I KELLY

ENGINE SUPPLIER:    USAF, KELLY AFB

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:   12    ENGINE TYPE AND MODEL:  T56-A7KB                      SERIAL NUMBER:    AF-104215

                            RATED HORSEPOWER:     3755.

     ENGINE TOTAL TIME:                                5743. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         0. HRS
          N2 COMPRESSOR OVERHAUL:                        -0. HRS
          COMBUSTOR CAN REPLACEMENT:                      0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
          N1 TURBINE OVERHAUL:                            0. HRS
          N2 TURBINE OVERHAUL:                           -0. HRS

     FUEL: JP-4                FUEL H/C RATIO:   1.995

OPERATIONAL DATA ********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   90.00   FINISH   90.00

     ATMOSPHERIC PRESSURE:              START   29.14   FINISH   29.14

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0147

     RELATIVE HUMIDITY:                    43.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    0.50

NUMBER OF TESTS:   8

COMMENTS:

F/A CALCULATION BASED ON EXHAUST COMPOSITION FOR LAST RUN


 ELAPSED   TEST        POWER               ENGINE            MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE      TURBINE
  TIME     MODE   THRUST,LBS  PERCENT      SPEED               FUEL    AIR FLOW     F/A      DISCHARGE   PRESSURE      INLET
                      OR       RATED        RPM                FLOW     LB/SEC                 TEMP        RATIO        TEMP
                      SHP      T.O.     N1           N2       LB/HR                         DEGREES F       EPR      DEGREES F

   0.0     1/ 0    2105.00      56   13810.00      -0.00    1410.00     30.10   0.013000      -0.00        -0.00       1508.00
   5.30    2/ 1    2992.00      79   13780.00      -0.00    1740.00     30.10   0.016100      -0.00        -0.00       1710.00
  10.00    3/ 2    3268.00      87   13800.00      -0.00    1850.00     30.10   0.017000      -0.00        -0.00       1775.00
  16.15    4/ 3     840.00      22   13240.00      -0.00     895.00     27.80   0.008900      -0.00        -0.00       1204.00
  17.30    5/ 4    3470.00      92   14200.00      -0.00    2052.00     31.80   0.017900      -0.00        -0.00       1952.00
  19.00    4/ 5     840.00      22   13240.00      -0.00     895.00     27.80   0.009900      -0.00        -0.00       1208.00
  19.45    8/ 6     423.00      11   13340.00      -0.00     765.00     28.30   0.007500      -0.00        -0.00       1108.00
  22.00    7/ 8     141.00       3    9890.00      -0.00     585.00     15.00   0.010800      -0.00        -0.00       1202.00


  POWER    EXHAUST     EXHAUST          CO         CO        THC       NO        NO         NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS           (WET)        2       (WET)     (WET)       2          X
  RATED     TEMP       PRESSURE        PPMV       (WET)      PPMV      PPMV     (WET)      (WET)
  T.O.    DEGREES F      PSIA                   PERCENT V                      PPMV       PPMV

   56       -0.00       -0.00         41.00       2.38      0.0      66.00     7.00      73.00     -0.00      -0.00      -0.00
   79       -0.00       -0.00         37.00       2.93      0.0      98.00     7.00     105.00     -0.00      -0.00      -0.00
   87       -0.00       -0.00         33.00       3.16      0.0     108.00     5.00     113.00     -0.00      -0.00      -0.00
   22       -0.00       -0.00         34.00       1.71      0.0       0.0      0.0       35.00     -0.00      -0.00      -0.00
   92       -0.00       -0.00         31.00       3.46      0.0       0.0      0.0      113.00     -0.00      -0.00      -0.00
   22       -0.00       -0.00         33.00       1.73      0.0       0.0      0.0       35.00     -0.00      -0.00      -0.00
   11       -0.00       -0.00         32.00       1.43      0.0       0.0      0.0       28.00     -0.00      -0.00      -0.00
    3       -0.00       -0.00        311.00       2.19    228.00     11.00    18.00      29.00     -0.00      -0.00      -0.00


  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
  RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   56       3.44      0.0       0.96   3133.47      9.08     10.05      4.84      0.0       1.36   4418.20    12.81     14.17
   79       2.52      0.0       0.78   3134.91     10.96     11.74      4.38      0.0       1.36   5454.75    19.07     20.44
   87       2.09      0.0       0.52   3135.60     11.20     11.72      3.86      0.0       0.96   5800.85    20.73     21.69
   22       3.96      0.0       0.0    3132.64      0.0       6.70      3.55      0.0       0.0    2803.72     0.0       6.00
   92       1.79      0.0       0.0    3136.06      0.0      10.71      3.67      0.0       0.0    6435.20     0.0      21.97
   22       3.80      0.0       0.0    3132.90      0.0       6.63      3.40      0.0       0.0    2803.94     0.0       5.93
   11       4.46      0.0       0.0    3131.86      0.0       6.41      3.41      0.0       0.0    2395.88     0.0       4.90
    3      27.69     11.63      2.63   3063.48      1.61      4.24     16.20      6.80      1.54   1792.13     0.94      2.48


  POWER          CO              CO              THC              NO              NO              NO
 PERCENT                          2                                                2               X
  RATED     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR
  T.O.

   56          2.301        2098.906           0.0             6.085           0.645           6.730
   79          1.470        1829.224           0.0             6.396           0.457           6.853
   87          1.180        1775.046           0.0             6.342           0.294           6.636
   22          4.224        3317.757           0.0             0.0             0.0             7.142
   92          1.057        1854.523           0.0             0.0             0.0             6.332
   22          4.052        3338.027           0.0             0.0             0.0             7.060
   11          8.067        5664.008           0.0             0.0             0.0            11.594
    3        114.876       12710.164          48.234           6.674          10.921          17.595
    CAL ID NUMBER:   12   ENGINE TYPE AND MODEL: T56-A7KB              SERIAL NUMBER:    AE-104215

TEST ORGANIZATION:  S W R I KELLY


  MODF    FRACTIONAL     POWER   EMISSION    FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY   LB CO /
            POWER         HP       RATE      RATE     WT FACTOR     MODE      MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                   LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.030        112.6   21.649    609.222    1.000       19.00    6.855      192.92    35.535       35.67    0.19218
TAKEOFF     1.000       3755.0   0.0      2256.038    1.000        0.50    0.0         18.80     0.0         31.29    0.0
CLIMBOUT    0.900       3379.5    1.666   1953.967    1.000        2.50    0.069       81.42     0.853      140.81    0.00049
APPROACH    0.300       1126.5    3.642   1002.166    1.000        4.50    0.273       75.16     3.635       84.49    0.00323
TAXI-IDLE   0.030        112.6   21.649    609.222    1.000        7.00    2.526       71.08    35.535       13.14    0.19218

                                 TOTAL FOR CYCLE:                          9.724      439.37                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:          22.131
                                 LBS POLLUTANT/1K HP-HR/CYCLE:            31.839
                                 LBS POLLUTANT/1000K HP AT T.O.:           0.0


  MODE    FRACTIONAL     POWER   EMISSION    FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY   LB HC /
            POWER         HP       RATE      RATE     WT FACTOR     MODE      MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                   LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.030        112.6    7.955    609.222    1.000       19.00    2.519      192.92    13.057       35.67    0.07062
TAKEOFF     1.000       3755.0   0.0      2256.038    1.000        0.50    0.0         18.80     0.0         31.29    0.0
CLIMBOUT    0.900       3379.5   0.004    1953.967    1.000        2.50    0.000       81.42     0.002      140.81    0.00000
APPROACH    0.300       1126.5   0.0      1002.166    1.000        4.50    0.0         75.16     0.0         84.49    0.0
TAXI-IDLE   0.030        112.6    7.955    609.222    1.000        7.00    0.928       71.08    13.057       13.14    0.07062

                                 TOTAL FOR CYCLE:                          3.447      439.37                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           7.846
                                 LBS POLLUTANT/1K HP-HR/CYCLE:            11.287
                                 LBS POLLUTANT/1000K HP AT T.O.:           0.0


  MODE    FRACTIONAL     POWER   EMISSION    FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY   LB NOX/
            POWER         HP       RATE      RATE     WT FACTOR     MODE      MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                   LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.030        112.6    2.027    609.222    1.000       19.00    0.642      192.92     3.327       35.67    0.01799
TAKEOFF     1.000       3755.0   25.869   2256.038    1.000        0.50    0.216       18.80    11.467       31.29    0.00689
CLIMBOUT    0.900       3379.5   22.794   1953.967    1.000        2.50    0.950       81.42    11.665      140.81    0.00674
APPROACH    0.300       1126.5    7.169   1002.166    1.000        4.50    0.538       75.16     7.154       84.49    0.00636
TAXI-IDLF   0.030        112.6    2.027    609.222    1.000        7.00    0.236       71.08     3.327       13.14    0.01799

                                 TOTAL FOR CYCLE:                          2.581      439.37                305.41
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           5.875
                                 LBS POLLUTANT/1K HP-HR/CYCLE:             8.452
                                 LBS POLLUTANT/1000K HP AT T.O.:          57.411
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DATE: 6/24/71

TEST ORGANIZATION: S W R I KELLY

ENGINE SUPPLIER: USAF, KELLY AFB

ENGINE DATA **

CAL ID NUMBER: 11 ENGINE TYPE AND MODEL: T56-A15 SERIAL NUMBER: AE-106634

RATED HORSEPOWER: 4591.

ENGINE TOTAL TIME: 2779. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 0. HRS
N2 COMPRESSOR OVERHAUL: -0. HRS
COMBUSTOR CAN REPLACEMENT: 0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 0. HRS
N1 TURBINE OVERHAUL: 0. HRS
N2 TURBINE OVERHAUL: -0. HRS

FUEL: JP-4 FUEL H/C RATIO: 1.995

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 79.00 FINISH 80.00

ATMOSPHERIC PRESSURE: START 29.29 FINISH 29.29

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0167

RELATIVE HUMIDITY: 76.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 0.50

NUMBER OF TESTS: 10

COMMENTS:

F/A CALCULATION BASED ON EXHAUST COMPOSITION FOR ALL RUNS

ELAPSED TIME	TEST MODE	POWER THRUST, LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	1/ 0	2610.00	56	13820.00	-0.00	1600.00	13.40	0.013300	-0.00	-0.00	1605.00
6.00	2/ 1	3838.00	83	13800.00	-0.00	2085.00	33.90	0.017100	-0.00	-0.00	1872.00
11.00	3/ 2	4173.00	89	13820.00	-0.00	2180.00	33.60	0.018000	-0.00	-0.00	1920.00
16.30	6/ 3	4386.00	95	13800.00	-0.00	2275.00	31.40	0.020100	-0.00	-0.00	1968.00
19.00	4/ 6	848.00	18	13360.00	-0.00	930.00	31.10	0.008300	-0.00	-0.00	1212.00
21.00	5/ 4	4452.00	96	13820.00	-0.00	2295.00	31.70	0.020100	-0.00	-0.00	2035.00
22.00	6/ 5	4320.00	94	13800.00	-0.00	2275.00	31.40	0.020100	-0.00	-0.00	1970.00
25.00	4/ 6	911.00	19	13350.00	-0.00	955.00	31.60	0.008400	-0.00	-0.00	1230.00
27.00	7/ 4	127.00	2	9990.00	-0.00	585.00	13.40	0.012100	-0.00	-0.00	1238.00
28.30	8/ 7	233.00	5	13350.00	-0.00	750.00	30.20	0.006900	-0.00	-0.00	1124.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
56	-0.00	-0.00	23.00	2.69	8.00	61.00	7.00	68.00	-0.00	-0.00	-0.00
83	-0.00	-0.00	22.00	3.45	8.00	93.00	4.00	97.00	-0.00	-0.00	-0.00
89	-0.00	-0.00	22.00	3.62	9.00	93.00	6.00	99.00	-0.00	-0.00	-0.00
95	-0.00	-0.00	21.00	4.04	11.00	102.00	9.00	111.00	-0.00	-0.00	-0.00
18	-0.00	-0.00	29.00	1.67	9.00	0.0	0.0	33.00	-0.00	-0.00	-0.00
96	-0.00	-0.00	21.00	4.04	12.00	0.0	0.0	111.00	-0.00	-0.00	-0.00
94	-0.00	-0.00	21.00	4.04	11.00	102.00	9.00	111.00	-0.00	-0.00	-0.00
19	-0.00	-0.00	29.00	1.70	9.00	0.0	0.0	35.00	-0.00	-0.00	-0.00
2	-0.00	-0.00	378.00	2.44	185.00	9.00	19.00	28.00	-0.00	-0.00	-0.00
5	-0.00	-0.00	40.00	1.40	18.00	0.0	0.0	29.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
56	1.71	0.34	0.85	3135.26	7.43	8.29	2.73	0.54	1.36	5016.41	11.89	13.26
83	1.27	0.27	0.38	3136.15	8.84	9.22	2.65	0.55	0.79	6538.86	18.43	19.22
89	1.21	0.28	0.54	3136.19	8.42	8.97	2.64	0.62	1.18	6836.88	18.36	19.55
95	1.04	0.31	0.73	3136.19	8.28	9.01	2.36	0.71	1.66	7135.28	18.83	20.49
18	3.46	0.62	0.0	3131.75	0.0	6.47	3.22	0.57	0.0	2912.53	0.0	6.02
96	1.04	0.34	0.0	3136.31	0.0	9.01	2.38	0.78	0.0	7197.82	0.0	20.67
94	1.04	0.31	0.73	3136.39	8.28	9.01	2.36	0.71	1.66	7135.28	19.83	20.49
19	3.40	0.60	0.0	3131.87	0.0	6.74	3.25	0.58	0.0	2990.94	0.0	6.44
2	30.01	17.51	2.48	3043.69	1.17	3.65	17.56	10.24	1.45	1780.56	0.69	2.14
5	5.68	1.66	0.0	3125.93	0.0	6.77	4.26	1.10	0.0	2344.44	0.0	5.08

POWER PERCENT RATED T.O.	CO LB/1K HP-HR	CO_2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO_2 LB/1K HP-HR	NO_x LB/1K HP-HR
56	1.046	1921.496	0.208	4.556	0.523	5.079
83	0.691	1733.716	0.144	4.801	0.207	5.008
89	0.641	1658.230	0.150	4.453	0.287	4.741
95	0.538	1626.830	0.161	4.294	0.374	4.673
18	3.796	3434.[illegible]96	0.675	0.0	0.0	7.095
96	0.535	1616.762	0.175	0.0	0.0	4.644
94	0.546	1651.685	0.164	4.359	0.385	4.744
19	3.565	3283.139	0.634	0.0	0.0	7.066
2	138.235	14020.164	40.636	5.404	11.413	16.819
5	18.297	10041.988	4.716	0.0	0.0	21.789

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     CAL ID NUMBER:   11   ENGINE TYPE AND MODEL: T56-A15               SERIAL NUMBER:   AF-106634

TEST ORGANIZATION:  S W R I KELLY

  MODE    FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN     CO        FUEL      LB CO /     ENERGY   LB CO /
            POWER          HP       RATE       RATE     WT FACTOR    MODE      MASS      MASS    1K LB FUEL    HP-HR     HP-HR
                                   LB/HR      LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.030        137.7   30.255    575.225     1.000       19.00     9.581     182.15     52.598      43.61    0.21967
TAKEOFF     1.000       4591.0    2.112   2358.710     1.000        0.50     0.018      19.66      0.895      38.26    0.00046
CLIMBOUT    0.900       4131.9    2.345   2164.557     1.000        2.50     0.098      90.19      1.083     172.16    0.00057
APPROACH    0.300       1377.3    3.149   1135.413     1.000        4.50     0.236      85.16      2.774     103.30    0.00229
TAXI-IDLE   0.030        137.7   30.255    575.225     1.000        7.00     3.530      67.11     52.598      16.07    0.21967

                                 TOTAL FOR CYCLE:                           13.462     444.27                373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            30.302
                                 LBS POLLUTANT/1K HP-HR/CYCLE:              36.053
                                 LBS POLLUTANT/1000K HP AT T.O.:             0.383


  MODE    FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN     HC        FUEL      LB HC /     ENERGY   LB HC /
            POWER          HP       RATE       RATE     WT FACTOR    MODE      MASS      MASS    1K LB FUEL    HP-HR     HP-HR
                                   LB/HR      LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.030        137.7   18.507    575.225     1.000       19.00     5.861     182.15     32.174      43.61    0.13437
TAKEFOFF    1.000       4591.0    0.557   2358.710     1.000        0.50     0.005      19.66      0.236      38.26    0.00012
CLIMBOUT    0.900       4131.9    0.511   2164.557     1.000        2.50     0.021      90.19      0.236     172.16    0.00012
APPROACH    0.300       1377.3    0.544   1135.413     1.000        4.50     0.041      85.16      0.479     103.30    0.00039
TAXI-IDLE   0.030        137.7   18.507    575.225     1.000        7.00     2.159      67.11     32.174      16.07    0.13437

                                 TOTAL FOR CYCLE:                            8.086     444.27                373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            18.202
                                 LBS POLLUTANT/1K HP-HR/CYCLE:              21.656
                                 LBS POLLUTANT/1000K HP AT T.O.:             1.010


  MODE    FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN     NOX       FUEL      LB NOX/     ENERGY   LB NOX/
            POWER          HP       RATE       RATE     WT FACTOR    MODE      MASS      MASS    1K LB FUEL    HP-HR     HP-HR
                                   LB/HR      L3/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.030        137.7    1.660    575.225     1.000       19.00     0.526     182.15      2.885      43.61    0.01205
TAKEOFF     1.000       4591.0   21.327   2358.710     1.000        0.50     0.178      19.66      9.042      38.26    0.00465
CLIMBOUT    0.900       4131.9   19.560   2164.557     1.000        2.50     0.815      90.19      9.036     172.16    0.00473
APPROACH    0.300       1377.3    8.398   1135.413     1.000        4.50     0.630      85.16      7.397     103.30    0.00610
TAXI-IDLE   0.030        137.7    1.660    575.225     1.000        7.00     0.194      67.11      2.885      16.07    0.01205

                                 TOTAL FOR CYCLE:                            2.342     444.27                373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             5.271
                                 LRS POLLUTANT/1K HP-HR/CYCLE:               6.271
                                 LBS POLLUTANT/1000K HP AT T.O.:            38.712
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DATE:   6/16/71

TEST ORGANIZATION:  ALLISON DIVISION

ENGINE SUPPLIER:    ALLISON DIVISION
ENGINE DATA *****************************************************************************************************
                                                                              SERIAL NUMBER:    8506
    CAL ID NUMBER:   18    ENGINE TYPE AND MODEL:  T56-A15

                       RATED HORSEPOWER:     4591.

                                                          0. HRS
    ENGINE TOTAL TIME:
                                                          0. HRS
    TIME SINCE HOT SECTION OVERHAUL:

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                          0. HRS
         N2 COMPRESSOR OVERHAUL:                          0. HRS
         COMBUSTOR CAN REPLACEMENT:                       0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
         N1 TURBINE OVERHAUL:                             0. HRS
         N2 TURBINE OVERHAUL:                             0. HRS

    FUEL: JP-5              FUEL H/C RATIO:   1.970
OPERATIONAL DATA ***************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   90.00   FINISH   88.00

    ATMOSPHERIC PRESSURE:              START   28.70   FINISH   28.90

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0096

    RELATIVE HUMIDITY:                    30.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  154.44,  FLOW RATE, LITERS/MIN:    5.00

    SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   7

COMMENTS:

FINAL RUN

                                                                                                  COMPRESSOR    ENGINE      TURBINE
                                    ENGINE                MEASURED    GAS GEN      CALC       DISCHARGE    PRESSURE     INLET
  CLOCK     TEST       POWER          SPEED                  FUEL      AIR FLOW     F/A          TEMP        RATIO       TEMP
  TIME      MODE   THRUST,LBS PERCENT  RPM                   FLOW      LB/SEC                 DEGREES F      EPR      DEGREES F
                       OR      RATED                        LB/HR
                      SHP      T.O.     N1          N2

  -0.00     1/ 0     235.60      5   13500.00     -0.00     721.00      29.83    0.006700      -0.00        -0.00      1090.00
  -0.00     2/ 1    2342.90     51   13800.00     -0.00    1522.00      29.79    0.014200      -0.00        -0.00      1610.00
  -0.00     3/ 2    3590.90     78   13800.00     -0.00    1925.00    2972.00    0.017990      -0.00        -0.00      1850.00
  -0.00     5/ 3    4160.30     90   13800.00     -0.00    2152.00      29.72    0.020100      -0.00        -0.00      1970.00
  -0.00     6/ 5    1081.50     23   14200.00     -0.00    1058.00      27.17    0.010800      -0.00        -0.00      1385.00
  -0.00     7/ 6     829.20     18   13200.00     -0.00     900.00      29.58    0.008500      -0.00        -0.00      1175.00
  -0.00    15/ 7     257.00      5   13500.00     -0.00     730.00      29.97    0.006800      -0.00        -0.00      1085.00

                                                                        NO        NO      ALDEHYDES   SMOKE   PARTICULATES
  POWER    EXHAUST     EXHAUST       CO        CO       THC      NO       2         X
 PERCENT     GAS         GAS        (DRY)       2       (WET)   (DRY)    (DRY)     (DRY)
  RATED     TEMP      PRESSURE      PPMV      (DRY)     PPMV    PPMV     PPMV      PPMV
  T.O.    DEGREES F     PSIA                PERCENT V

    5       -0.00       -0.00       50.00      1.42     40.00   -0.00    -0.00     32.00     -0.00     62.00     -0.00
   51       -0.00       -0.00       30.00      3.23     13.00   -0.00    -0.00     97.00     -0.00     59.00     -0.00
   78       -0.00       -0.00       32.00      4.10      2.00   -0.00    -0.00    129.00     -0.00     60.00     -0.00
   90       -0.00       -0.00       34.00      4.43      2.00   -0.00    -0.00    152.00     -0.00     60.00     -0.00
   23       -0.00       -0.00       35.00      3.07      3.00   -0.00    -0.00    129.00     -0.00     57.00     -0.00
   18       -0.00       -0.00       52.00      2.08      3.00   -0.00    -0.00     71.00     -0.00     62.00     -0.00
    5       -0.00       -0.00       50.00      1.42     23.00   -0.00    -0.00     30.00     -0.00     62.00     -0.00

                                                                                                                   MASS EMI
                                                                          MASS EMI MASS EMI MASS EMI MASS EMI MASS EMI  NOX
  POWER   MASS EMI MASS EMI MASS EMI MASS EMI  MASS EMI MASS EMI  MASS EMI    HC      NO2      CO2       NO     LB/HR
 PERCENT     CO       HC       NO2      CO2       NO       NOX       CO     LB/HR    LB/HR    LB/HR    LB/HR
  RATED    LB/1K    LB/1K    LB/1K    LB/1K     LB/1K    LB/1K     LB/HR
  T.O.    LB FUEL  LB FUEL  LB FUEL  LB FUEL   LB FUEL  LB FUEL

    5       7.00     3.25    -0.00   3124.60   -0.00     7.36      5.05     2.35    -0.00   2252.84   -0.00     5.31
   51       1.86     0.48    -0.00   3140.30   -0.00     9.86      2.83     0.72    -0.00   4779.54   -0.00    15.01
   78       1.56     0.06    -0.00   3141.91   -0.00    10.33      3.00     0.11    -0.00   6048.18   -0.00    19.89
   90       1.53     0.05    -0.00   3141.97   -0.00    11.27      3.30     0.12    -0.00   6761.50   -0.00    24.25
   23       2.28     0.12    -0.00   3140.63   -0.00    13.80      2.41     0.12    -0.00   3322.78   -0.00    14.60
   18       4.99     0.17    -0.00   3136.22   -0.00    11.19      4.49     0.15    -0.00   2822.60   -0.00    10.07
    5       7.01     1.87    -0.00   3128.37   -0.00     6.91      5.12     1.37    -0.00   2283.71   -0.00     5.04

                                                                            NO             NO
                                            THC              NO             2              X
  POWER        CO            CO                                       LB/1K HP-HR    LB/1K HP-HR
 PERCENT                      2         LB/1K HP-HR     LB/1K HP-HR
  RATED    LB/1K HP-HR   LB/1K HP-HR
  T.O.

    5        21.429       9562.121         9.956          -0.000         -0.000         22.527
   51         1.206       2040.010         0.309          -0.000         -0.000          6.404
   78         0.937       1694.308         0.031          -0.000         -0.000          5.540
   90         0.794       1625.246         0.028          -0.000         -0.000          5.830
   23         2.229       3072.385         0.113          -0.000         -0.000         13.496
   18         5.416       3404.004         0.183          -0.000         -0.000         12.147
    5        19.914       8886.035         5.320          -0.000         -0.000         19.626
   CAL ID NUMBER:   18   ENGINE TYPE AND MODEL: T56-A15                      SERIAL NUMBER:   8506

TEST ORGANIZATION:  ALLISON DIVISION

  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY    LB CO /
             POWER       HP       RATE       RATE     WT FACTOR     MODE      MASS      MASS    1K LB FUEL    HP-HR      HP-HR
                                  LB/HR      LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.030       137.7     2.987     406.335     1.000      19.00     0.946    128.67      7.351      43.61     0.02169
TAKEOFF     1.000      4591.0     3.867    2334.892     1.000       0.50     0.032     19.46      1.656      38.26     0.00084
CLIMBOUT    0.900      4131.9     3.535    2134.571     1.000       2.50     0.147     88.94      1.656     172.16     0.00086
APPROACH    0.300      1377.3     2.604    1184.325     1.000       4.50     0.195     88.82      2.198     103.30     0.00189
TAXI-IDLE   0.030       137.7     2.987     406.335     1.000       7.00     0.348     47.41      7.351      16.07     0.02169

                             TOTAL FOR CYCLE:                               1.669    373.30                373.40
                             LBS POLLUTANT/1K LB FUEL/CYCLE:                4.471
                             LBS POLLUTANT/1K HP-HR/CYCLE:                  4.470
                             LBS POLLUTANT/1000K HP AT T.O.:                0.702

  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY    LB HC /
             POWER       HP       RATE       RATE     WT FACTOR     MODE      MASS      MASS    1K LB FUEL    HP-HR      HP-HR
                                  LB/HR      LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.030       137.7     6.425     406.335     1.000      19.00     2.035    128.67     15.813      43.61     0.04665
TAKEOFF     1.000      4591.0     0.044    2334.892     1.000       0.50     0.000     19.46      0.019      38.26     0.00001
CLIMBOUT    0.900      4131.9     0.058    2134.571     1.000       2.50     0.002     88.94      0.027     172.16     0.00001
APPROACH    0.300      1377.3     0.095    1184.325     1.000       4.50     0.007     88.82      0.080     103.30     0.00007
TAXI-IDLE   0.030       137.7     6.425     406.335     1.000       7.00     0.750     47.41     15.813      16.07     0.04665

                             TOTAL FOR CYCLE:                               2.794    373.30                373.40
                             LBS POLLUTANT/1K LB FUEL/CYCLE:                7.485
                             LBS POLLUTANT/1K HP-HR/CYCLE:                  7.483
                             LBS POLLUTANT/1000K HP AT T.O.:                0.081

  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY    LB NOX/
             POWER       HP       RATE       RATE     WT FACTOR     MODE      MASS      MASS    1K LB FUEL    HP-HR      HP-HR
                                  LB/HR      LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.030       137.7     1.633     406.335     1.000      19.00     0.517    128.67      4.020      43.61     0.01186
TAKEOFF     1.000      4591.0    30.075    2334.892     1.000       0.50     0.251     19.46     12.881      38.26     0.00655
CLIMBOUT    0.900      4131.9    23.783    2134.571     1.000       2.50     0.991     88.94     11.142     172.16     0.00576
APPROACH    0.300      1377.3    10.397    1184.325     1.000       4.50     0.777     88.82      8.745     103.30     0.00752
TAXI-IDLE   0.030       137.7     1.633     406.335     1.000       7.00     0.191     47.41      4.020      16.07     0.01186

                             TOTAL FOR CYCLE:                               2.726    373.30                373.40
                             LBS POLLUTANT/1K LB FUEL/CYCLE:                7.303
                             LBS POLLUTANT/1K HP-HR/CYCLE:                  7.301
                             LBS POLLUTANT/1000K HP AT T.O.:               54.591
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DATE:   6/23/71

TEST ORGANIZATION:  ALLISON DIVISION

ENGINE SUPPLIER:    ALLISON DIVISION

ENGINE DATA ******************************************************************************************

    CAL ID NUMBER:   19    ENGINE TYPE AND MODEL:  T56-A15                  SERIAL NUMBER:    8509

                        RATED HORSEPOWER:     4591.

    ENGINE TOTAL TIME:                                    0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                          0. HRS
         N2 COMPRESSOR OVERHAUL:                          0. HRS
         COMBUSTOR CAN REPLACEMENT:                       0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
         N1 TURBINE OVERHAUL:                             0. HRS
         N2 TURBINE OVERHAUL:                             0. HRS

    FUEL: JP-5                  FUEL H/C RATIO:   1.970

OPERATIONAL DATA ******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   90.00   FINISH   91.00

     ATMOSPHERIC PRESSURE:              START   28.70   FINISH   28.90

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0094

     RELATIVE HUMIDITY:                       29.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  154.44,  FLOW RATE, LITERS/MIN:     5.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   8

COMMENTS:

FINAL RUN


 CLOCK      TEST            POWER               ENGINE            MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE      TURBINE
 TIME       MODE     THRUST,LBS  PERCENT         SPEED               FUEL    AIR FLOW    F/A     DISCHARGE    PRESSURE      INLET
                         OR       RATED           RPM                FLOW     LB/SEC                TEMP        RATIO        TEMP
                        SHP       T.O.        N1          N2        LB/HR                        DEGREES F      EPR      DEGREES F

  -0.00     1/ 0      235.60        5   13500.00       -0.00       718.00     29.73   0.006700      -0.00       -0.00        990.00
  -0.00     2/ 1     2539.90       55   13800.00       -0.00      1544.00     -0.00   0.014400      -0.00       -0.00       1610.00
  -0.00     3/ 2     3591.00       78   13800.00       -0.00      1940.00     29.62   0.018200      -0.00       -0.00       1850.00
  -0.00     4/ 3     3853.70       83   13800.00       -0.00      2045.00     29.72   0.019100      -0.00       -0.00       1920.00
  -0.00     5/ 4     4335.40       94   13800.00       -0.00      2128.00     29.65   0.019900      -0.00       -0.00       1970.00
  -0.00     7/ 5      829.20       18   13400.00       -0.00       908.00     29.48   0.008600      -0.00       -0.00       1250.00
  -0.00     9/ 7     4116.50       89   13800.00       -0.00      2150.00     29.58   0.020200      -0.00       -0.00       1970.00
  -0.00    14/ 9       95.20        2   10000.00       -0.00       572.00     20.08   0.003800      -0.00       -0.00       1205.00


 POWER     EXHAUST      EXHAUST          CO        CO        THC        NO         NO          NO      ALDEHYDES   SMOKE   PARTICULATES
PERCENT      GAS          GAS           (DRY)        2      (WET)      (DRY)        2           X
 RATED       TEMP       PRESSURE        PPMV      (DRY)      PPMV       PPMV      (DRY)       (DRY)
 T.O.     DEGREES F       PSIA                  PERCENT V                          PPMV        PPMV

   5        -0.00        -0.00         52.00      1.70      32.00     -0.00      -0.00       46.00     -0.00      52.00      -0.00
  55        -0.00        -0.00         37.00      3.46       5.00     -0.00      -0.00      102.00     -0.00      53.00      -0.00
  78        -0.00        -0.00         37.00      4.42       3.00     -0.00      -0.00      142.00     -0.00      53.00      -0.00
  83        -0.00        -0.00         35.00      4.55       2.00     -0.00      -0.00      145.00     -0.00      53.00      -0.00
  94        -0.00        -0.00         35.00      4.70       3.00     -0.00      -0.00      150.00     -0.00      53.00      -0.00
  18        -0.00        -0.00         37.00      2.18       8.00     -0.00      -0.00       32.00     -0.00      54.00      -0.00
  89        -0.00        -0.00         35.00      4.90       3.00     -0.00      -0.00      150.00     -0.00      53.00      -0.00
   2        -0.00        -0.00        450.00      3.08     340.00     -0.00      -0.00       29.00     -0.00      41.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   5        6.09      2.18     -0.00    3128.97    -0.00      8.85      4.37      1.57     -0.00    2246.60    -0.00       6.36
  55        2.14      0.17     -0.00    3140.70    -0.00      9.68      3.30      0.26     -0.00    4849.23    -0.00      14.94
  78        1.67      0.08     -0.00    3141.67    -0.00     10.55      3.25      0.16     -0.00    6094.84    -0.00      20.47
  83        1.54      0.05     -0.00    3141.96    -0.00     10.47      3.15      0.11     -0.00    6425.31    -0.00      21.41
  94        1.49      0.09     -0.00    3141.97    -0.00     10.48      3.17      0.16     -0.00    6686.12    -0.00      22.31
  18        3.39      0.43     -0.00    3138.02    -0.00      4.82      3.08      0.39     -0.00    2849.33    -0.00       4.37
  89        1.43      0.07     -0.00    3142.08    -0.00     10.06      3.07      0.16     -0.00    6755.46    -0.00      21.62
   2       28.46     14.19     -0.00    3060.88    -0.00      3.01     16.28      8.12     -0.00    1750.82    -0.00       1.72


 POWER          CO               CO              THC               NO               NO               NO
PERCENT                           2                                                   2                X
 RATED     LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR
 T.O.

   5          18.564          9535.641           6.653           -0.000           -0.000           26.974
  55           1.299          1909.223           0.104           -0.000           -0.000            5.884
  78           0.906          1697.255           0.044           -0.000           -0.000            5.700
  83           0.816          1667.309           0.028           -0.000           -0.000            5.555
  94           0.731          1542.215           0.038           -0.000           -0.000            5.145
  18           3.712          3436.234           0.470           -0.000           -0.000            5.273
  89           0.746          1641.070           0.038           -0.000           -0.000            5.252
   2         171.013         18391.000          85.253           -0.000           -0.000           18.102
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    CAL ID NUMBER:   19   ENGINE TYPE AND MODEL: T56-A15              SERIAL NUMBER:   8509

TEST ORGANIZATION:  ALLISON DIVISION


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      CO       FUEL     LB CO /    ENERGY   LB CO /
             POWER        HP       RATE      RATE    WT FACTOR     MODE      MASS      MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR     LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.030       137.7     4.170   463.900     1.000       19.00     1.320    146.90      8.988      43.61    0.03027
TAKEOFF     1.000      4591.0     2.874  2242.194     1.000        0.50     0.024     18.68      1.282      38.26    0.00063
CLIMBOUT    0.900      4131.9     2.806  2105.092     1.000        2.50     0.117     87.71      1.333     172.16    0.00068
APPROACH    0.300      1377.3     3.122  1106.484     1.000        4.50     0.234     82.99      2.822     103.30    0.00227
TAXI-IDLE   0.030       137.7     4.170   463.900     1.000        7.00     0.486     54.12      8.988      16.07    0.03027

                                 TOTAL FOR CYCLE:                           2.182    390.41                373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            5.589
                                 LBS POLLUTANT/1K HP-HR/CYCLE:              5.843
                                 LBS POLLUTANT/1000K HP AT T.O.:            0.522


  MODF    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      HC       FUEL     LB HC /    ENERGY   LB HC /
             POWER        HP       RATE      RATE    WT FACTOR     MODE      MASS      MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR     LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.030       137.7     6.147   463.900     1.000       19.00     1.946    146.90     13.250      43.61    0.04463
TAKEOFF     1.000      4591.0     0.0    2242.194     1.000        0.50     0.0       18.68      0.0        38.26    0.0
CLIMBOUT    0.900      4131.9     0.001  2105.092     1.000        2.50     0.000     87.71      0.001     172.16    0.00000
APPROACH    0.300      1377.3     0.360  1106.484     1.000        4.50     0.027     82.99      0.325     103.30    0.00026
TAXI-IDLE   0.030       137.7     6.147   463.900     1.000        7.00     0.717     54.12     13.250      16.07    0.04463

                                 TOTAL FOR CYCLE:                           2.691    390.41                373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            6.892
                                 LBS POLLUTANT/1K HP-HR/CYCLE:              7.206
                                 LBS POLLUTANT/1000K HP AT T.O.:            0.0


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     NOX       FUEL     LB NOX/    ENERGY   LB NOX/
             POWER        HP       RATE      RATE    WT FACTOR     MODE      MASS      MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR     LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.030       137.7     1.412   463.900     1.000       19.00     0.447    146.90      3.045      43.61    0.01026
TAKEOFF     1.000      4591.0    23.554  2242.194     1.000        0.50     0.196     18.68     10.505      38.26    0.00513
CLIMBOUT    0.900      4131.9    22.167  2105.092     1.000        2.50     0.924     87.71     10.530     172.16    0.00536
APPROACH    0.300      1377.3     7.015  1106.484     1.000        4.50     0.526     82.99      6.340     103.30    0.00509
TAXI-IDLE   0.030       137.7     1.412   463.900     1.000        7.00     0.165     54.12      3.045      16.07    0.01026

                                 TOTAL FOR CYCLE:                           2.258    390.41                373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            5.784
                                 LBS POLLUTANT/1K HP-HR/CYCLE:              6.047
                                 LBS POLLUTANT/1000K HP AT T.O.:           42.754
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DATE: 6/28/71

TEST ORGANIZATION: ALLISON DIVISION

ENGINE SUPPLIER: ALLISON DIVISION

ENGINE DATA **

CAL ID NUMBER: 20 ENGINE TYPE AND MODEL: T56-A15 SERIAL NUMBER: 8516

RATED HORSEPOWER: 4591.

ENGINE TOTAL TIME: 0. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	0. HRS
N2 COMPRESSOR OVERHAUL:	0. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	0. HRS
N1 TURBINE OVERHAUL:	0. HRS
N2 TURBINE OVERHAUL:	0. HRS

FUEL: JP-5 FUEL H/C RATIO: 1.970

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 82.00 FINISH 78.00

ATMOSPHERIC PRESSURE: START 28.80 FINISH 29.10

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0115

RELATIVE HUMIDITY: 47.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 154.44, FLOW RATE, LITERS/MIN: 5.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 9

COMMENTS:

GREEN RUN

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
-0.00	2/ 0	212.60	4	13400.00	-0.00	714.00	30.39	0.006500	-0.00	-0.00	1070.00
-0.00	3/ 2	2605.60	56	13800.00	-0.00	1575.00	30.96	0.014100	-0.00	-0.00	1610.00
-0.00	4/ 3	3678.50	80	13800.00	-0.00	1970.00	30.75	0.017800	-0.00	-0.00	1850.00
-0.00	18/ 4	257.00	5	13500.00	-0.00	753.00	30.76	0.006800	-0.00	-0.00	1075.00
-0.00	10/18	4313.50	93	13800.00	-0.00	2190.00	30.78	0.019800	-0.00	-0.00	1970.00
-0.00	12/10	807.90	17	13400.00	-0.00	896.00	30.68	0.008100	-0.00	-0.00	1195.00
-0.00	6/12	4204.00	91	13800.00	-0.00	2175.00	30.78	0.019600	-0.00	-0.00	1970.00
-0.00	8/ 6	807.30	17	13400.00	-0.00	900.00	30.61	0.008200	-0.00	-0.00	1195.00
-0.00	17/ 8	95.20	2	10000.00	-0.00	560.00	20.16	0.007700	-0.00	-0.00	1180.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PPMV	CO_2 (DRY) PERCENT V	THC (WET) PPMV	NO (DRY) PPMV	NO_2 (DRY) PPMV	NO_x (DRY) PPMV	ALDEHYDES	SMOKE	PARTICULATES
4	-0.00	-0.00	63.00	1.51	7.00	-0.00	-0.00	24.00	-0.00	50.00	-0.00
56	-0.00	-0.00	34.00	3.30	3.00	-0.00	-0.00	88.00	-0.00	56.00	-0.00
80	-0.00	-0.00	36.00	4.10	3.00	-0.00	-0.00	115.00	-0.00	58.00	-0.00
5	-0.00	-0.00	63.00	1.51	7.00	-0.00	-0.00	24.00	-0.00	50.00	-0.00
93	-0.00	-0.00	43.00	4.40	3.00	-0.00	-0.00	164.00	-0.00	56.00	-0.00
17	-0.00	-0.00	58.00	2.10	3.00	-0.00	-0.00	42.00	-0.00	54.00	-0.00
91	-0.00	-0.00	40.00	4.40	3.00	-0.00	-0.00	138.00	-0.00	56.00	-0.00
17	-0.00	-0.00	57.00	2.05	3.00	-0.00	-0.00	28.00	-0.00	54.00	-0.00
2	-0.00	-0.00	375.00	2.50	370.00	-0.00	-0.00	6.00	-0.00	42.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
4	8.31	0.54	-0.00	3129.99	-0.00	5.20	5.93	0.38	-0.00	2234.82	-0.00	3.71
56	2.06	0.11	-0.00	3140.99	-0.00	8.76	3.24	0.17	-0.00	4947.06	-0.00	13.79
80	1.76	0.09	-0.00	3141.53	-0.00	9.21	3.46	0.17	-0.00	6188.80	-0.00	18.15
5	8.31	0.54	-0.00	3129.99	-0.00	5.20	6.26	0.40	-0.00	2356.89	-0.00	3.92
93	1.95	0.08	-0.00	3141.23	-0.00	12.24	4.28	0.18	-0.00	6879.29	-0.00	26.81
17	5.51	0.17	-0.00	3135.41	-0.00	6.56	4.94	0.15	-0.00	2809.33	-0.00	5.87
91	1.82	0.08	-0.00	3141.45	-0.00	10.30	3.95	0.18	-0.00	6832.64	-0.00	22.40
17	5.55	0.17	-0.00	3135.34	-0.00	4.48	4.99	0.15	-0.00	2821.81	-0.00	4.03
2	29.14	16.88	-0.00	3052.43	-0.00	0.77	16.32	9.45	-0.00	1709.36	-0.00	0.43

POWER PERCENT RATED T.O.	CO LB/1K HP-HR	CO_2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO_2 LB/1K HP-HR	NO_x LB/1K HP-HR
4	27.913	19511.832	1.803	-0.000	-0.000	17.466
56	1.245	1898.627	0.065	-0.000	-0.000	5.293
80	0.940	1642.427	0.047	-0.000	-0.000	4.933
5	24.352	9170.758	1.573	-0.000	-0.000	15.238
93	0.392	1594.829	0.041	-0.000	-0.000	6.214
17	6.112	3477.320	0.185	-0.000	-0.000	7.270
91	0.940	1625.271	0.042	-0.000	-0.000	5.329
17	6.181	3492.766	0.190	-0.000	-0.000	4.987
2	171.416	17955.504	99.286	-0.000	-0.000	4.505

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   CAL ID NUMBER:   20   ENGINE TYPE AND MODEL: T56-A15                    SERIAL NUMBER:   8516

TEST ORGANIZATION:  ALLISON DIVISION

  MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE     TIME IN      CO       FUEL     LB CO /    ENERGY    LB CO /
             POWER        HP      RATE      RATE    WT FACTOR    MODE       MASS      MASS   1K LB FUEL   HP-HR      HP-HR
                                  LB/HR     LB/HR                 MIN.       LBS.      LBS.

TAXI-IDLE   0.030       137.7   10.176    612.968    1.000       19.00     3.222     194.11    16.601     43.61    0.07388
TAKEOFF     1.000      4591.0    4.573   2280.831    1.000        0.50     0.038      19.01     2.005     38.26    0.00100
CLIMBOUT    0.900      4131.9    3.602   2133.054    1.000        2.50     0.150      88.88     1.689    172.16    0.00087
APPROACH    0.300      1377.3    4.281   1138.158    1.000        4.50     0.321      85.36     3.761    103.30    0.00311
TAXI-IDLE   0.030       137.7   10.176    612.968    1.000        7.00     1.187      71.51    16.601     16.07    0.07388

                              TOTAL FOR CYCLE:                             4.919     458.87              373.40
                              LBS POLLUTANT/1K LB FUEL/CYCLE:             10.720
                              LBS POLLUTANT/1K HP-HR/CYCLE:               13.173
                              LBS POLLUTANT/1000K HP AT T.O.:              0.830

  MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE     TIME IN      HC       FUEL     LB HC /    ENERGY    LB HC /
             POWER        HP      RATE      RATE    WT FACTOR    MODE       MASS      MASS   1K LB FUEL   HP-HR      HP-HR
                                  LB/HR     LB/HR                 MIN.       LBS.      LBS.

TAXI-IDLE   0.030       137.7   13.048    612.968    1.000       19.00     4.132     194.11    21.287     43.61    0.09474
TAKEOFF     1.000      4591.0    0.091   2280.831    1.000        0.50     0.001      19.01     0.040     38.26    0.00002
CLIMBOUT    0.900      4131.9    0.085   2133.054    1.000        2.50     0.004      88.88     0.040    172.16    0.00002
APPROACH    0.300      1377.3    0.052   1138.158    1.000        4.50     0.004      85.36     0.046    103.30    0.00004
TAXI-IDLE   0.030       137.7   13.048    612.968    1.000        7.00     1.522      71.51    21.287     16.07    0.09474

                              TOTAL FOR CYCLE:                             5.662     458.87              373.40
                              LBS POLLUTANT/1K LB FUEL/CYCLE:             12.340
                              LBS POLLUTANT/1K HP-HR/CYCLE:               15.164
                              LBS POLLUTANT/1000K HP AT T.O.:              0.166

  MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE     TIME IN     NOX       FUEL     LB NOX/    ENERGY    LB NOX/
             POWER        HP      RATE      RATE    WT FACTOR    MODE       MASS      MASS   1K LB FUEL   HP-HR      HP-HR
                                  LB/HR     LB/HR                 MIN.       LBS.      LBS.

TAXI-IDLE   0.030       137.7    0.611    612.968    1.000       19.00     0.194     194.11     0.997     43.61    0.00444
TAKEOFF     1.000      4591.0   28.681   2280.831    1.000        0.50     0.239      19.01    12.575     38.26    0.00625
CLIMBOUT    0.900      4131.9   25.520   2133.054    1.000        2.50     1.063      88.88    11.964    172.16    0.00618
APPROACH    0.300      1377.3    6.487   1138.158    1.000        4.50     0.487      85.36     5.700    103.30    0.00471
TAXI-IDLE   0.030       137.7    0.611    612.968    1.000        7.00     0.071      71.51     0.997     16.07    0.00444

                              TOTAL FOR CYCLE:                             2.054     458.87              373.40
                              LBS POLLUTANT/1K LB FUEL/CYCLE:              4.476
                              LBS POLLUTANT/1K HP-HR/CYCLE:                5.500
                              LBS POLLUTANT/1000K HP AT T.O.:             52.061
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DATE:   6/29/71

TEST ORGANIZATION:  ALLISON DIVISION

ENGINE SUPPLIER:    ALLISON DIVISION

ENGINE DATA ************************************************************************************************************

    CAL ID NUMBER:   21    ENGINE TYPE AND MODEL:  T56-A15                         SERIAL NUMBER:    8518

                           RATED HORSEPOWER:      4591.

    ENGINE TOTAL TIME:                                      0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                        0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                            0. HRS
         N2 COMPRESSOR OVERHAUL:                            0. HRS
         COMBUSTOR CAN REPLACEMENT:                         0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:            0. HRS
         N1 TURBINE OVERHAUL:                               0. HRS
         N2 TURBINE OVERHAUL:                               0. HRS

    FUEL: JP-5                  FUEL H/C RATIO:   1.970

OPERATIONAL DATA ******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   87.00   FINISH   83.00

     ATMOSPHERIC PRESSURE:              START   28.70   FINISH   29.00

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0140

     RELATIVE HUMIDITY:                   50.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  154.44,  FLOW RATE, LITERS/MIN:     5.00

     SAMPLE LINE TRANSPORT TIME, SEC:     1.00

NUMBER OF TESTS:  11

COMMENTS:

GREEN RUN


  CLOCK     TEST          POWER                    ENGINE             MEASURED   GAS GEN     CALC     COMPRESSOR     ENGINE      TURBINE
  TIME      MODE    THRUST,LBS  PERCENT            SPEED                FUEL    AIR FLOW     F/A      DISCHARGE     PRESSURE      INLET
                        OR       RATED              RPM                 FLOW     LB/SEC                  TEMP         RATIO        TEMP
                       SHP       T.O.        N1              N2         LB/HR                         DEGREES F       EPR       DEGREES F

   -0.00    2/ 0      235.60       5     13500.00         -0.00       731.00     29.94    0.006800      -0.00        -0.00       1065.00
   -0.00    3/ 2     2671.30      58     13800.00         -0.00      1589.00     29.93    0.014700      -0.00        -0.00       1610.00
   -0.00    4/ 3     3679.50      80     13800.00         -0.00      1980.00     30.00    0.018300      -0.00        -0.00       1850.00
   -0.00    5/ 4     3985.10      86     13800.00         -0.00      2118.00     29.97    0.019600      -0.00        -0.00       1920.00
   -0.00   10/ 5     4269.70      93     13800.00         -0.00      2260.00     29.97    0.020900      -0.00        -0.00       1970.00
   -0.00   12/10      765.40      16     13400.00         -0.00       890.00     30.21    0.008700      -0.00        -0.00       1165.00
   -0.00    6/12     4247.80      92     13800.00         -0.00      2241.00     29.97    0.020800      -0.00        -0.00       1970.00
   -0.00    8/ 6      765.40      16     13400.00         -0.00       889.00     30.14    0.009200      -0.00        -0.00       1165.00
   -0.00   14/ 8     4247.80      92     13800.00         -0.00      2258.00     30.04    0.020900      -0.00        -0.00       1970.00
    8.00   17/14       95.20       2     10000.00         -0.00       560.00     20.14    0.007700      -0.00        -0.00       1160.00
   -0.00   18/17      235.60       5     13500.00         -0.00       742.00     30.32    0.006800      -0.00        -0.00       1050.00


                                                                                        NO     ALDEHYDES    SMOKE    PARTICULATES
  POWER     EXHAUST       EXHAUST        CO          CO         THC       NO       NO       X
 PERCENT      GAS           GAS         (DRY)         2        (WET)    (DRY)       2     (DRY)
  RATED      TEMP        PRESSURE       PPMV        (DRY)       PPMV     PPMV     (DRY)    PPMV
  T.O.     DEGREES F       PSIA                   PERCENT V                       PPMV

    5        -0.00        -0.00        59.00        7.55       3.00     -0.00    -0.00     40.00     -0.00       52.00      -0.00
   58        -0.00        -0.00        34.00        3.43       3.00     -0.00    -0.00     68.00     -0.00       54.00      -0.00
   80        -0.00        -0.00        34.00        4.32      15.00     -0.00    -0.00    114.00     -0.00       55.00      -0.00
   86        -0.00        -0.00        36.00        4.53      14.00     -0.00    -0.00    116.00     -0.00       56.00      -0.00
   93        -0.00        -0.00        50.00        4.70      10.00     -0.00    -0.00    118.00     -0.00       56.00      -0.00
   16        -0.00        -0.00        54.00        2.18      10.00     -0.00    -0.00     40.00     -0.00       54.00      -0.00
   92        -0.00        -0.00        39.00        4.70      15.00     -0.00    -0.00    114.00     -0.00       56.00      -0.00
   16        -0.00        -0.00        54.00        2.15      10.00     -0.00    -0.00     38.00     -0.00       54.00      -0.00
   92        -0.00        -0.00        39.00        4.70       5.00     -0.00    -0.00    112.00     -0.00       56.00      -0.00
    2        -0.00        -0.00       355.00        2.70     390.00     -0.00    -0.00     30.00     -0.00       42.00      -0.00
    5        -0.00        -0.00        59.00        1.55       3.00     -0.00    -0.00     14.00     -0.00       52.00      -0.00


  POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2        NO         NOX         CO         HC         NO2        CO2        NO         NOX
  RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    5        1.56       0.05      -0.00    3141.93      -0.00       1.74       1.14       0.04      -0.00    2296.75      -0.00       1.27
   58        1.98       0.10      -0.00    3141.13      -0.00       6.51       3.15       0.16      -0.00    4991.25      -0.00      10.34
   80        1.57       0.41      -0.00    3140.92      -0.00       8.66       3.12       0.82      -0.00    6219.01      -0.00      17.16
   86        1.59       0.37      -0.00    3141.01      -0.00       8.41       3.36       0.78      -0.00    6652.66      -0.00      17.81
   93        2.13       0.25      -0.00    3140.48      -0.00       8.24       4.81       0.58      -0.00    7097.49      -0.00      18.63
   16        4.94       0.54      -0.00    3135.29      -0.00       6.01       4.40       0.48      -0.00    2790.41      -0.00       5.35
   92        1.66       0.38      -0.00    3140.87      -0.00       7.96       3.72       0.86      -0.00    7038.68      -0.00      17.85
   16        5.01       0.54      -0.00    3135.16      -0.00       5.79       4.46       0.48      -0.00    2787.16      -0.00       5.15
   92        1.66       0.13      -0.00    3141.57      -0.00       7.83       3.75       0.29      -0.00    7093.66      -0.00      17.67
    2       25.60      16.54      -0.00    3058.93      -0.00       3.55      14.33       9.76      -0.00    1713.00      -0.00       1.99
    5        7.59       0.22      -0.00    3131.99      -0.00       2.96       5.63       0.17      -0.00    2323.93      -0.00       2.19


                                                                                 NO                 NO
  POWER          CO                 CO               THC              NO            2                  X
 PERCENT                             2
  RATED     LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR      LB/1K HP-HR   LB/1K HP-HR        LB/1K HP-HR
 , T.O.

    5          4.849            9748.527            0.152           -0.000        -0.000             5.399
   58          1.179            1868.473            0.062           -0.000        -0.000             3.872
   80          0.947            1690.637            0.223           -0.000        -0.000             4.664
   86          0.944            1669.385            0.196           -0.000        -0.000             4.469
   93          1.125            1662.293            0.135           -0.000        -0.000             4.363
   16          5.747            3645.685            0.623           -0.000        -0.000             6.993
   92          0.375            1657.020            0.202           -0.000        -0.000             4.202
   16          5.821            3641.440            0.630           -0.000        -0.000             6.728
   92          0.892            1669.961            0.068           -0.000        -0.000             4.160
    2        150.573           17993.715           97.292           -0.000        -0.000            20.901
    5         23.896            9863.898            0.707           -0.000        -0.000             9.314
    CAL ID NUMBER:   21   ENGINE TYPE AND MODEL: T56-A15              SERIAL NUMBER:   8518

TEST ORGANIZATION:  ALLISON DIVISION


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /    ENERGY   LB CO /
            POWER        HP        RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   HP-HR    HP-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.030       137.7     7.255    246.359     1.000      19.00      2.297      78.01     29.448      43.61    0.05267
TAKEOFF     1.000      4591.0     3.981   2428.125     1.000       0.50      0.033      20.23      1.640      38.26    0.00087
CLIMBOUT    0.900      4131.9     3.320   2193.454     1.000       2.50      0.138      91.39      1.514     172.16    0.00080
APPROACH    0.300      1377.3     3.750   1128.447     1.000       4.50      0.281      84.63      3.323     103.30    0.00272
TAXI-IDLE   0.030       137.7     7.255    246.359     1.000       7.00      0.846      28.74     29.448      16.07    0.05267

                                 TOTAL FOR CYCLE:                            3.596     303.02                373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            11.869
                                 LBS POLLUTANT/1K HP-HR/CYCLE:               9.632
                                 LBS POLLUTANT/1000K HP AT T.O.:             0.723


  MODF    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /    ENERGY   LB HC /
            POWER        HP        RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   HP-HR    HP-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.030       137.7     4.540    246.359     1.000      19.00      1.438      78.01     18.429      43.61    0.03296
TAKEOFF     1.000      4591.0     0.756   2428.125     1.000       0.50      0.006      20.23      0.311      38.26    0.00016
CLIMBOUT    0.900      4131.9     0.611   2193.454     1.000       2.50      0.025      91.39      0.278     172.16    0.00015
APPROACH    0.300      1377.3     0.361   1128.447     1.000       4.50      0.027      84.63      0.320     103.30    0.00026
TAXI-IDLE   0.030       137.7     4.540    246.359     1.000       7.00      0.530      28.74     18.429      16.07    0.03296

                                 TOTAL FOR CYCLE:                            2.026     303.02                373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             6.687
                                 LBS POLLUTANT/1K HP-HR/CYCLE:               5.426
                                 LBS POLLUTANT/1000K HP AT T.O.:             1.372


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/    ENERGY   LB NOX/
            POWER        HP        RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   HP-HR    HP-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.030       137.7     0.390    246.359     1.000      19.00      0.124      78.01      1.585      43.61    0.00283
TAKEOFF     1.000      4591.0    21.488   2428.125     1.000       0.50      0.179      20.23      8.850      38.26    0.00468
CLIMBOUT    0.900      4131.9    18.556   2193.454     1.000       2.50      0.773      91.39      8.460     172.16    0.00449
APPROACH    0.300      1377.3     4.875   1128.447     1.000       4.50      0.366      84.63      4.320     103.30    0.00354
TAXI-IDLE   0.030       137.7     0.390    246.359     1.000       7.00      0.046      28.74      1.585      16.07    0.00283

                                 TOTAL FOR CYCLE:                            1.487     303.02                373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             4.907
                                 LBS POLLUTANT/1K HP-HR/CYCLE:               3.982
                                 LBS POLLUTANT/1000K HP AT T.O.:            39.004
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DATE:   6/25/71

TEST ORGANIZATION:  ALLISON DIVISION

ENGINE SUPPLIER:    ALLISON DIVISION

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:   22    ENGINE TYPE AND MODEL:  T56-A15                   SERIAL NUMBER:    8512

                         RATED HORSEPOWER:     4591.

     ENGINE TOTAL TIME:                                     0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                       0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                           0. HRS
          N2 COMPRESSOR OVERHAUL:                           0. HRS
          COMBUSTOR CAN REPLACEMENT:                        0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:           0. HRS
          N1 TURBINE OVERHAUL:                              0. HRS
          N2 TURBINE OVERHAUL:                              0. HRS

     FUEL: JP-5                 FUEL H/C RATIO:   1.970

OPERATIONAL DATA ***************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    90.00   FINISH   98.00

     ATMOSPHERIC PRESSURE:              START    28.60   FINISH   29.00

     INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0155

     RELATIVE HUMIDITY:                     49.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  154.44,  FLOW RATE, LITERS/MIN:      5.00

     SAMPLE LINE TRANSPORT TIME, SEC:     1.00

NUMBER OF TESTS:  10

COMMENTS:

GREEN RUN


                                                                 MEASURED    GAS GEN       CALC    COMPRESSOR     ENGINE      TURBINE
 CLOCK       TEST          POWER                  ENGINE          FUEL      AIR FLOW       F/A     DISCHARGE     PRESSURE      INLET
 TIME        MODE    THRUST,LBS  PERCENT          SPEED           FLOW       LB/SEC                  TEMP         RATIO         TEMP
                         OR       RATED            RPM            LB/HR                           DEGREES F        EPR       DEGREES F
                         SHP      T.O.      N1            N2

                                                                                                                              1040.00
  -0.00      2/ 0      235.60       5    13500.00      -0.00     714.00      29.62    0.006700     -0.00         -0.00       1610.00
  -0.00      3/ 2     2539.90      55    13800.00      -0.00    1530.00      29.35    0.014500     -0.00         -0.00       1850.00
  -0.00      4/ 3     3503.30      76    13800.00      -0.00    1900.00      29.31    0.018000     -0.00         -0.00       1080.00
  -0.00     18/ 4      235.60       5    13500.00      -0.00     712.00      29.42    0.006700     -0.00         -0.00       1970.00
  -0.00     10/18     3985.10      86    13800.00      -0.00    2110.00      29.17    0.020100     -0.00         -0.00       1205.00
  -0.00     12/10      807.90      17    13400.00      -0.00     881.00      29.42    0.008300     -0.00         -0.00       1970.00
  -0.00      6/12     3985.10      86    13800.00      -0.00    2110.00      29.17    0.020100     -0.00         -0.00       1205.00
  -0.00      8/ 6      786.60      17    13400.00      -0.00     872.00      29.42    0.008200     -0.00         -0.00       1970.00
  -0.00     14/ 8     3985.10      86    13800.00      -0.00    2110.00      29.17    0.020100     -0.00         -0.00       1200.00
  -0.00     17/14       95.20       2    10000.00      -0.00     554.00      20.09    0.007700     -0.00         -0.00


                                                                                 NO        ALDEHYDES    SMOKE    PARTICULATES
  POWER     EXHAUST       EXHAUST          CO          CO        THC       NO         NO        X
 PERCENT      GAS           GAS          (DRY)          2       (WET)    (DRY)        2       (DRY)
  RATED      TEMP        PRESSURE         PPMV        (DRY)      PPMV     PPMV      (DRY)      PPMV
  T.O.     DEGREES F       PSIA                     PERCENT V                        PPMV

                                                                                                                    -0.00
    5        -0.00        -0.00          65.00       1.35       3.00     -0.00     -0.00      37.00      -0.00      50.00      -0.00
   55        -0.00        -0.00          34.00       3.03       3.00     -0.00     -0.00      91.00      -0.00      54.00      -0.00
   76        -0.00        -0.00          32.00       3.68       3.00     -0.00     -0.00     138.00      -0.00      54.00      -0.00
    5        -0.00        -0.00          66.00       1.55       0.30     -0.00     -0.00      18.00      -0.00      50.00      -0.00
   86        -0.00        -0.00          41.00       4.35       3.00     -0.00     -0.00     106.00      -0.00      57.00      -0.00
   17        -0.00        -0.00          57.00       3.00       3.00     -0.00     -0.00      32.00      -0.00      55.00      -0.00
   86        -0.00        -0.00          39.00       4.15       3.00     -0.00     -0.00     130.00      -0.00      57.00      -0.00
   17        -0.00        -0.00          55.00       2.00       3.00     -0.00     -0.00      42.00      -0.00      55.00      -0.00
   86        -0.00        -0.00          39.00       4.35       3.00     -0.00     -0.00      88.00      -0.00      57.00      -0.00
    2        -0.00        -0.00         380.00       2.65     331.00     -0.00     -0.00      18.00      -0.00      43.00


                                                                                                          MASS EMI
  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI    NOX
 PERCENT      CO        HC       NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO       LB/HR
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

                                                                                                                 6.40
    5        9.73      0.26     -0.00    3128.53    -0.00      8.96      6.95      0.18     -0.00    2233.77    -0.00     15.09
   55        2.24      0.12     -0.00    3140.68    -0.00      9.66      3.43      0.18     -0.00    4805.24    -0.00     23.40
   76        1.74      0.10     -0.00    3141.53    -0.00     12.32      3.30      0.16     -0.00    5968.90    -0.00      2.71
    5        8.49      0.02     -0.00    3131.13    -0.00      3.80      6.04      0.02     -0.00    2229.36    -0.00     16.88
   86        1.38      0.08     -0.00    3141.34    -0.00      8.00      3.98      0.17     -0.00    6628.22    -0.00      3.08
   17        3.79      0.12     -0.00    3138.24    -0.00      3.50      3.34      0.10     -0.00    2764.79    -0.00     21.71
   86        1.88      0.09     -0.00    3141.34    -0.00     10.29      3.96      0.18     -0.00    6628.21    -0.00      6.00
   17        5.49      0.17     -0.00    3135.42    -0.00      6.88      4.79      0.15     -0.00    2734.09    -0.00     14.02
   86        1.79      0.09     -0.00    3141.48    -0.00      6.64      3.78      0.17     -0.00    6628.52    -0.00      1.20
    2       27.94     14.31     -0.00    3061.37    -0.00      2.17     15.48      7.93     -0.00    1696.00    -0.00


                                                                                  NO              NO
  POWER         CO                 CO                THC              NO             2               X
 PERCENT                            2
  RATED    LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR
  T.O.

                                                                                                     27.165
    5        29.501            9491.188            0.778           -0.000          -0.000            5.940
   55         1.351            1891.901            0.070           -0.000          -0.000            6.679
   76         0.943            1703.794            0.052           -0.000          -0.000           11.488
    5        25.444            9462.492            0.068           -0.000          -0.000            4.237
   86         0.398            1653.251            0.044           -0.000          -0.000            3.816
   17         4.138            3422.191            0.128           -0.000          -0.000            5.447
   86         0.395            1663.250            0.046           -0.000          -0.000            7.631
   17         6.083            3475.831            0.194           -0.000          -0.000            3.518
   86         0.349            1653.327            0.044           -0.000          -0.000           12.650
    2       162.588           17815.148           83.258           -0.000          -0.000
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     CAL ID NUMBER:   22   ENGINE TYPE AND MODEL: T56-A15                 SERIAL NUMBER:   8512

TEST ORGANIZATION:  ALLISON DIVISION

  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      CO       FUEL    LB CO /     ENERGY   LB CO /
             POWER        HP      RATE       RATE     WT FACTOR    MODE       MASS      MASS   1K LB FUEL   HP-HR     HP-HR
                                  LB/HR      LB/HR                 MIN.       LBS.      LBS.

TAXI-IDLE   0.030       137.7   13.859    524.128     1.000       19.00      4.389    165.97     26.442     43.61    0.10063
TAKEOFF     1.000      4591.0    5.242   2400.930     1.000        0.50      0.044     20.01      2.183     38.26    0.00114
CLIMBOUT    0.900      4131.9    4.162   2198.515     1.000        2.50      0.173     91.60      1.893    172.16    0.00101
APPROACH    0.300      1377.3    4.465   1166.815     1.000        4.50      0.335     87.51      3.827    103.30    0.00324
TAXI-IDLE   0.030       137.7   13.859    524.128     1.000        7.00      1.617     61.15     26.442     16.07    0.10063

                                TOTAL FOR CYCLE:                             6.558    426.25                373.40
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             15.385
                                LBS POLLUTANT/1K HP-HR/CYCLE:               17.562
                                LBS POLLUTANT/1000K HP AT T.O.:              0.951


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      HC       FUEL    LB HC /     ENERGY   LB HC /
             POWER        HP      RATE       RATE     WT FACTOR    MODE       MASS      MASS   1K LB FUEL   HP-HR     HP-HR
                                  LB/HR      LB/HR                 MIN.       LBS.      LBS.

TAXI-IDLE   0.030       137.7   13.812    524.128     1.000       19.00      4.374    165.97     26.352     43.61    0.10028
TAKEOFF     1.000      4591.0    0.071   2400.930     1.000        0.50      0.001     20.01      0.030     38.26    0.00002
CLIMBOUT    0.900      4131.9    0.079   2198.515     1.000        2.50      0.003     91.60      0.036    172.16    0.00002
APPROACH    0.300      1377.3    0.138   1166.815     1.000        4.50      0.010     87.51      0.118    103.30    0.00013
TAXI-IDLE   0.030       137.7   13.812    524.128     1.000        7.00      1.611     61.15     26.352     16.07    0.10028

                                TOTAL FOR CYCLE:                             5.999    426.25                373.40
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             14.075
                                LBS POLLUTANT/1K HP-HR/CYCLE:               16.067
                                LBS POLLUTANT/1000K HP AT T.O.:              0.130


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     NOX       FUEL    LB NOX/     ENERGY   LB NOX/
             POWER        HP      RATE       RATE     WT FACTOR    MODE       MASS      MASS   1K LB FUEL   HP-HR     HP-HR
                                  LB/HR      LB/HR                 MIN.       LBS.      LBS.

TAXI-IDLE   0.030       137.7    0.414    524.128     1.000       19.00      0.131    165.97      0.790     43.61    0.00301
TAKEOFF     1.000      4591.0   30.582   2400.930     1.000        0.50      0.255     20.01     12.737     38.26    0.00666
CLIMBOUT    0.900      4131.9   26.629   2198.515     1.000        2.50      1.110     91.60     12.112    172.16    0.00644
APPROACH    0.300      1377.3    6.709   1166.815     1.000        4.50      0.503     87.51      5.750    103.30    0.00487
TAXI-IDLE   0.030       137.7    0.414    524.128     1.000        7.00      0.048     61.15      0.790     16.07    0.00301

                                TOTAL FOR CYCLE:                             2.047    426.25                373.40
                                LBS POLLUTANT/1K LB FUEL/CYCLE:              4.802
                                LBS POLLUTANT/1K HP-HR/CYCLE:                5.482
                                LBS POLLUTANT/1000K HP AT T.O.:             55.510
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DATE:   6/25/71

TEST ORGANIZATION:  ALLISON DIVISION

ENGINE SUPPLIER:    ALLISON DIVISION

ENGINE DATA ************************************************************************************************************

    CAL ID NUMBER:   21    ENGINE TYPE AND MODEL:  T56-A15                       SERIAL NUMBER:    8513

                          RATED HORSEPOWER:      4591.

    ENGINE TOTAL TIME:                                     0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                       0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                           0. HRS
         N2 COMPRESSOR OVERHAUL:                           0. HRS
         COMBUSTOR CAN REPLACEMENT:                        0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:           0. HRS
         N1 TURBINE OVERHAUL:                              0. HRS
         N2 TURBINE OVERHAUL:                              0. HRS

    FUEL: JP-5                FUEL H/C RATIO:   1.970

OPERATIONAL DATA *******************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   96.00   FINISH   97.00

    ATMOSPHERIC PRESSURE:              START   28.50   FINISH   28.80

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0163

    RELATIVE HUMIDITY:                    44.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  154.44,  FLOW RATE, LITERS/MIN:    5.00

    SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:  10

COMMENTS:

GREEN RUN


  CLOCK      TEST          POWER              ENGINE              MEASURED    GAS GEN     CALC     COMPRESSOR    ENGINE     TURBINE
  TIME       MODE    THRUST,LBS  PERCENT      SPEED                 FUEL     AIR FLOW     F/A      DISCHARGE    PRESSURE     INLET
                         OR      RATED         RPM                  FLOW      LB/SEC                  TEMP        RATIO       TEMP
                        SHP      T.O.      N1           N2          LB/HR                          DEGREES F      EPR      DEGREES F

  -0.00      2/ 0      214.20      4    13500.00     -0.00        708.00     29.39    0.006700      -0.00        -0.00      1070.00
  -0.00      3/ 2     2408.60     52    13800.00     -0.00       1490.00     29.01    0.014300      -0.00        -0.00      1610.00
  -0.00      4/ 3     3372.00     73    13800.00     -0.00       1862.00     28.87    0.179000      -0.00        -0.00      1850.00
  -0.00      5/ 4     2656.60     57    13800.00     -0.00       1977.00     28.87    0.019000      -0.00        -0.00      1970.00
  -0.00     10/ 5     3853.70     83    13800.00     -0.00       2074.00     28.87    0.020000      -0.00        -0.00      1970.00
  -0.00     12/10      829.20     18    13400.00     -0.00        896.00     29.04    0.008600      -0.00        -0.00      1230.00
  -0.00      6/12     3853.70     83    13800.00     -0.00       2072.00     28.90    0.020000      -0.00        -0.00      1970.00
  -0.00      8/ 6      829.20     18    13400.00     -0.00        902.00     29.08    0.008600      -0.00        -0.00      1235.00
  -0.00     17/ 4       63.50      1    10300.00     -0.00        564.00     20.08    0.007800      -0.00        -0.00      1210.00
  -0.00     18/17      214.20      4    13500.00     -0.00        711.00     29.02    0.006800      -0.00        -0.00      1070.00


  POWER     EXHAUST      EXHAUST         CO          CO        THC        NO         NO          NO      ALDEHYDES   SMOKE   PARTICULATES
 PERCENT      GAS          GAS          (DRY)          2       (WET)      (DRY)        2           X
  RATED      TEMP       PRESSURE        PPMV        (DRY)      PPMV       PPMV       (DRY)       (DRY)
  T.O.    DEGREES F       PSIA                    PERCENT V                          PPMV        PPMV

    4       -0.00        -0.00         55.00       1.59       3.00       0.0        0.0        21.00     -0.00      52.00      -0.00
   52       -0.00        -0.00         40.00       3.09       3.00       0.0        0.0        21.00     -0.00      52.00      -0.00
   73       -0.00        -0.00         35.00       4.05       3.00       0.0        0.0        89.00     -0.00      56.00      -0.00
   57       -0.00        -0.00         36.00       4.26      22.00       0.0        0.0       132.00     -0.00      55.00      -0.00
   83       -0.00        -0.00         40.00       4.41      10.00       0.0        0.0       139.00     -0.00      55.00      -0.00
   18       -0.00        -0.00         51.00       2.08      18.00       0.0        0.0        31.00     -0.00      56.00      -0.00
   83       -0.00        -0.00         39.00       4.44      19.00       0.0        0.0       123.00     -0.00      59.00      -0.00
   18       -0.00        -0.00         51.00       2.08      12.00       0.0        0.0        37.00     -0.00      56.00      -0.00
    1       -0.00        -0.00        375.00       2.77     350.00       0.0        0.0        23.00     -0.00      44.00      -0.00
    4       -0.00        -0.00         30.00       1.60       3.00       0.0        0.0        28.00     -0.00      52.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K    LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    4        6.90      0.22      0.0     3133.09     0.0       4.33      4.88      0.15      0.0     2218.23     0.0        3.06
   52        2.59      0.11      0.0     3140.15     0.0       2.23      3.85      0.17      0.0     4678.82     0.0        3.32
   73        1.73      0.09      0.0     3141.57     0.0       7.22      3.22      0.16      0.0     5869.59     0.0       13.44
   57        1.59      0.62      0.0     3140.18     0.0      10.17      3.34      1.22      0.0     6208.13     0.0       20.11
   83        1.81      0.27      0.0     3140.93     0.0      10.35      3.76      0.56      0.0     6514.29     0.0       21.46
   18        4.89      1.31      0.0     3134.07     0.0       4.88      4.30      0.90      0.0     2808.13     0.0        4.38
   83        1.76      0.51      0.0     3140.36     0.0       9.09      3.64      1.06      0.0     6506.83     0.0       18.84
   18        4.99      0.67      0.0     3134.39     0.0       5.83      4.41      0.61      0.0     2827.76     0.0        5.26
    1       26.39     14.59      0.0     3063.28     0.0       2.66     14.89      8.10      0.0     1727.69     0.0        1.50
    4        3.76      0.22      0.0     3138.05     0.0       5.74      2.66      0.15      0.0     2231.15     0.0        4.08


  POWER          CO                CO              THC               NO               NO               NO
 PERCENT                             2                                                  2                X
  RATED      LB/1K HP-HR     LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR
  T.O.

    4          22.799        10355.859           0.723            0.0              0.0             14.299
   52           1.600         1942.547           0.071            0.0              0.0              1.380
   73           0.954         1734.755           0.049            0.0              0.0              3.985
   57           1.257         2336.872           0.458            0.0              0.0              7.570
   83           0.376         1590.399           0.146            0.0              0.0              5.570
   18           5.265         3346.551           1.090            0.0              0.0              5.276
   83           0.944         1684.463           0.275            0.0              0.0              4.890
   18           5.122         3410.229           0.732            0.0              0.0              6.342
    1         234.426        27207.699         128.776            0.0              0.0             23.617
    4          12.430        10416.199           0.723            0.0              0.0             19.056
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     CAL ID NUMBER:   23   ENGINE TYPE AND MODEL: T56-A15                SERIAL NUMBER:   8513

TEST ORGANIZATION:  ALLISON DIVISION

  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN      CO        FUEL      LB CO /     ENERGY    LB CO /
            POWER        HP       RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL    HP-HR      HP-HR
                                  LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.030       137.7     5.426     628.715     1.000     19.00     1.718      199.09      8.630       43.61    0.03939
TAKEOFF     1.000      4591.0     6.136    2740.584     1.000      0.50     0.051       22.84      2.239       38.26    0.00134
CLIMBOUT    0.900      4131.9     5.139    2468.112     1.000      2.50     0.214      102.84      2.082      172.16    0.00124
APPROACH    0.300      1377.3     4.754    1152.463     1.000      4.50     0.357       86.43      4.125      103.30    0.00345
TAXI-IDLE   0.030       137.7     5.426     628.715     1.000      7.00     0.633       73.35      8.630       16.07    0.03939

                                TOTAL FOR CYCLE:                            2.973      484.55                  373.40
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             6.136
                                LBS POLLUTANT/1K HP-HR/CYCLE:               7.962
                                LBS POLLUTANT/1000K HP AT T.O.:             1.114


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN      HC        FUEL      LB HC /     ENERGY    LB HC /
            POWER        HP       RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL    HP-HR      HP-HR
                                  LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.030       137.7     7.138     628.715     1.000     19.00     2.261      199.09     11.354       43.61    0.05183
TAKEOFF     1.000      4591.0     1.146    2740.584     1.000      0.50     0.010       22.84      0.418       38.26    0.00025
CLIMBOUT    0.900      4131.9     1.060    2468.112     1.000      2.50     0.044      102.84      0.430      172.16    0.00026
APPROACH    0.300      1377.3     0.909    1152.463     1.000      4.50     0.068       86.43      0.789      103.30    0.00066
TAXI-IDLE   0.030       137.7     7.138     628.715     1.000      7.00     0.833       73.35     11.354       16.07    0.05183

                                TOTAL FOR CYCLE:                            3.215      484.55                  373.40
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             6.636
                                LBS POLLUTANT/1K HP-HR/CYCLE:               8.611
                                LBS POLLUTANT/1000K HP AT T.O.:             2.081


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN     NOX        FUEL      LB NOX/     ENERGY    LB NOX/
            POWER        HP       RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL    HP-HR      HP-HR
                                  LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.030       137.7     1.698     628.715     1.000     19.00     0.538      199.09      2.700       43.61    0.01233
TAKEOFF     1.000      4591.0    30.009    2740.584     1.000      0.50     0.250       22.84     10.950       38.26    0.00654
CLIMBOUT    0.900      4131.9    25.767    2468.112     1.000      2.50     1.074      102.84     10.440      172.16    0.00624
APPROACH    0.300      1377.3     6.562    1152.463     1.000      4.50     0.492       86.43      5.694      103.30    0.00476
TAXI-IDLE   0.030       137.7     1.698     628.715     1.000      7.00     0.198       73.35      2.700       16.07    0.01233

                                TOTAL FOR CYCLE:                            2.551      484.55                  373.40
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             5.266
                                LBS POLLUTANT/1K HP-HR/CYCLE:               6.833
                                LBS POLLUTANT/1000K HP AT T.O.:            54.471
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DATE:   6/29/71

TEST ORGANIZATION:  ALLISON DIVISION

ENGINE SUPPLIER:    ALLISON DIVISION

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:   24    ENGINE TYPE AND MODEL:  T56-A15                    SERIAL NUMBER:     8517

                        RATED HORSEPOWER:     4591.

     ENGINE TOTAL TIME:                                   0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         0. HRS
          N2 COMPRESSOR OVERHAUL:                         0. HRS
          COMBUSTOR CAN REPLACEMENT:                      0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
          N1 TURBINE OVERHAUL:                            0. HRS
          N2 TURBINE OVERHAUL:                            0. HRS

     FUEL: JP-5                FUEL H/C RATIO:   1.970

OPERATIONAL DATA ****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   86.00   FINISH   94.00

     ATMOSPHERIC PRESSURE:              START   28.90   FINISH   29.00

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0130

     RELATIVE HUMIDITY:                      48.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  154.44,  FLOW RATE, LITERS/MIN:     5.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:  11

COMMENTS:

GREEN RUN


  CLOCK     TEST          POWER                 ENGINE            MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE      TURBINE
  TIME      MODE    THRUST,LBS  PERCENT          SPEED              FUEL    AIR FLOW     F/A     DISCHARGE    PRESSURE      INLET
                        OR       RATED            RPM               FLOW     LB/SEC                 TEMP        RATIO        TEMP
                       SHP       T.O.        N1          N2         LB/HR                        DEGREES F       EPR      DEGREES F

  -0.00     2/ 0     235.60        5    13500.00     -0.00       726.00     20.09   0.006700      -0.00       -0.00      1070.00
  -0.00     3/ 2    2539.90       55    13800.00     -0.00      1570.00     29.76   0.014700      -0.00       -0.00      1610.00
  -0.00     4/ 3    3547.20       77    13800.00     -0.00      1950.00     29.59   0.018300      -0.00       -0.00      1850.00
  -0.00     5/ 4    3809.90       82    13900.00     -0.00      2065.00     29.45   0.019500      -0.00       -0.00      1920.00
  -0.00    10/ 5    4028.90       87    13800.00     -0.00      2150.00     29.38   0.020300      -0.00       -0.00      1970.00
  -0.00    12/10     607.90       17    13400.00     -0.00       892.00     29.65   0.008400      -0.00       -0.00      1200.00
  -0.00     6/12    4028.90       87    13800.00     -0.00      2150.00     29.38   0.020300      -0.00       -0.00      1970.00
  -0.00     8/ 6     829.20       18    13400.00     -0.00       896.00     29.65   0.008400      -0.00       -0.00      1200.00
  -0.00    14/ 8    4028.90       87    13800.00     -0.00      2150.00     29.38   0.020300      -0.00       -0.00      1970.00
  -0.00    17/14      95.20        2    10000.00     -0.00       586.00     20.16   0.008100      -0.00       -0.00      1140.00
  -0.00    18/17     235.60        5    13500.00     -0.00      1100.00     29.65   0.010300      -0.00       -0.00      1075.00


  POWER    EXHAUST     EXHAUST          CO          CO        THC        NO         NO          NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS          (DRY)          2       (WET)     (DRY)        2           X
  RATED     TEMP      PRESSURE        PPMV        (DRY)       PPMV      PPMV      (DRY)       (DRY)
  T.O.    DEGREES F     PSIA                    PERCENT V                         PPMV        PPMV

    5       -0.00       -0.00         54.00        1.40       3.00       0.0      -0.00       24.00       0.0      51.00      -0.00
   55       -0.00       -0.00         34.00        2.98       4.00       0.0      -0.00       68.00       0.0      58.00      -0.00
   77       -0.00       -0.00         32.00        4.23       3.00       0.0      -0.00      107.00       0.0      56.00      -0.00
   82       -0.00       -0.00         30.00        4.79       3.00       0.0      -0.00      114.00       0.0      57.00      -0.00
   87       -0.00       -0.00         32.00        4.98       3.00       0.0      -0.00      107.00       0.0      56.00      -0.00
   17       -0.00       -0.00         46.00        2.35       3.00       0.0      -0.00       32.00       0.0      54.00      -0.00
   87       -0.00       -0.00         30.00        4.93       3.00       0.0      -0.00      111.00       0.0      56.00      -0.00
   18       -0.00       -0.00         46.00        2.30       3.00       0.0      -0.00       34.00       0.0      54.00      -0.00
   87       -0.00       -0.00         29.00        4.90       3.00       0.0      -0.00      102.00       0.0      56.00      -0.00
    2       -0.00       -0.00        320.00        3.18     350.00       0.0      -0.00       20.00       0.0      42.00      -0.00
    5       -0.00       -0.00         55.00        1.18       3.00       0.0      -0.00       38.00       0.0      52.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2        NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    5        7.69      0.25     -0.00    3131.77      0.0      5.61      5.58      0.18     -0.00    2273.66     0.0       4.07
   55        2.28      0.12     -0.00    3140.62      0.0      7.49      3.58      0.19     -0.00    4930.76     0.0      11.76
   77        1.51      0.08     -0.00    3141.91      0.0      8.31      2.95      0.16     -0.00    6126.73     0.0      16.20
   82        1.25      0.08     -0.00    3142.35      0.0      7.82      2.59      0.16     -0.00    6488.95     0.0      16.14
   87        1.29      0.07     -0.00    3142.31      0.0      7.06      2.76      0.16     -0.00    6755.96     0.0      15.17
   17        3.91      0.15     -0.00    3137.97      0.0      4.47      3.49      0.13     -0.00    2799.07     0.0       3.98
   87        1.22      0.07     -0.00    3142.41      0.0      7.40      2.62      0.16     -0.00    6756.18     0.0      15.90
   18        3.99      0.15     -0.00    3137.83      0.0      4.85      3.58      0.14     -0.00    2811.50     0.0       4.34
   87        1.18      0.07     -0.00    3142.46      0.0      6.84      2.54      0.16     -0.00    6756.29     0.0      14.70
    2       19.72     12.74     -0.00    3076.59      0.0      2.02     11.55      7.47     -0.00    1804.05     0.0       1.19
    5        9.28      0.29     -0.00    3129.14      0.0     10.53     10.21      0.32     -0.00    3442.05     0.0      11.59


  POWER          CO                 CO                 THC                NO                 NO                NO
 PERCENT                             2                                                         2                 X
  RATED     LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR       LB/1K HP-HR
  T.O.

    5          23.691            9650.520             0.764              0.0             -0.000            17.295
   55           1.410            1941.322             0.073              0.0             -0.000             4.631
   77           0.932            1727.202             0.047              0.0             -0.000             4.567
   82           0.679            1703.181             0.041              0.0             -0.000             4.238
   87           0.686            1676.874             0.039              0.0             -0.000             3.766
   17           4.316            3664.625             0.165              0.0             -0.000             4.932
   87           0.649            1676.930             0.039              0.0             -0.000             3.947
   18           4.316            3390.614             0.165              0.0             -0.000             5.240
   87           0.632            1676.958             0.039              0.0             -0.000             3.649
    2         121.366           18950.141            78.431              0.0             -0.000            12.459
    5          43.340           14609.723             1.370              0.0             -0.000            49.184
    CAL ID NUMBER:   24   ENGINE TYPE AND MODEL: T56-A15                SERIAL NUMBER:   8517

TEST ORGANIZATION:  ALLISON DIVISION

   MODE    FRACTIONAL     POWER   EMISSION     FUEL      USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY   LB CO /
             POWER          HP       RATE       RATE   WT FACTOR     MODE      MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                    LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.030         137.7     8.492    379.608     1.000      19.00     2.689     120.21     22.371      43.61    0.06166
TAKEOFF     1.000        4591.0     1.631   2394.919     1.000       0.50     0.014      19.96      0.681      38.26    0.00036
CLIMBOUT    0.900        4131.9     2.269   2205.268     1.000       2.50     0.095      91.89      1.029     172.16    0.00055
APPROACH    0.300        1377.3     3.876   1154.689     1.000       4.50     0.291      86.60      3.356     103.30    0.00281
TAXI-IDLE   0.030         137.7     8.492    379.608     1.000       7.00     0.991      44.29     22.371      16.07    0.06166

                                 TOTAL FOR CYCLE:                             4.079     362.94                 373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             11.238
                                 LBS POLLUTANT/1K HP-HR/CYCLE:               10.923
                                 LBS POLLUTANT/1000K HP AT T.O.:              0.296


   MODE    FRACTIONAL     POWER   EMISSION     FUEL      USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY   LB HC /
             POWCR          HP       RATE       RATE   WT FACTOR     MODE      MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                    LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.030         137.7     4.476    379.608     1.000      19.00     1.417     120.21     11.791      43.61    0.03250
TAKEOFF     1.000        4591.0     0.0     2394.919     1.000       0.50     0.0        19.96      0.0        38.26    0.0
CLIMBOUT    0.900        4131.9     0.032   2205.268     1.000       2.50     0.001      91.89      0.015     172.16    0.00001
APPROACH    0.300        1377.3     0.161   1154.689     1.000       4.50     0.012      86.60      0.139     103.30    0.00012
TAXI-IDLE   0.030         137.7     4.476    379.608     1.000       7.00     0.522      44.29     11.791      16.07    0.03250

                                 TOTAL FOR CYCLE:                             1.953     362.94                 373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              5.381
                                 LBS POLLUTANT/1K HP-HR/CYCLE:                5.230
                                 LBS POLLUTANT/1000K HP AT T.O.:              0.0


   MODE    FRACTIONAL     POWER   EMISSION     FUEL      USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY   LB NOX/
             POWER          HP       RATE       RATE   WT FACTOR     MODE      MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                    LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.030         137.7     0.777    379.608     1.000      19.00     0.246     120.21      2.048      43.61    0.00564
TAKEOFF     1.000        4591.0    19.712   2394.919     1.000       0.50     0.164      19.96      8.231      38.26    0.00429
CLIMBOUT    0.900        4131.9    18.118   2205.268     1.000       2.50     0.755      91.89      8.216     172.16    0.00438
APPROACH    0.300        1377.3     6.666   1154.689     1.000       4.50     0.500      86.60      5.773     103.30    0.00484
TAXI-IDLE   0.030         137.7     0.777    379.608     1.000       7.00     0.091      44.29      2.048      16.07    0.00564

                                 TOTAL FOR CYCLE:                             1.756     362.94                 373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              4.838
                                 LBS POLLUTANT/1K HP-HR/CYCLE:                4.703
                                 LBS POLLUTANT/1000K HP AT T.O.:             35.780
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DATE:   6/18/71

TEST ORGANIZATION:  ALLISON DIVISION

ENGINE SUPPLIER:    ALLISON DIVISION

ENGINE DATA ***************************************************************************************************************

    CAL ID NUMBER:   25    ENGINE TYPE AND MODEL:  T56-A15                     SERIAL NUMBER:     8508

                           RATED HORSEPOWER:      4591.

    ENGINE TOTAL TIME:                                  0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                        0. HRS
         N2 COMPRESSOR OVERHAUL:                        0. HRS
         COMBUSTOR CAN REPLACEMENT:                     0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
         N1 TURBINE OVERHAUL:                           0. HRS
         N2 TURBINE OVERHAUL:                           0. HRS

    FUEL: JP-5                 FUEL H/C RATIO:   1.970

OPERATIONAL DATA ***************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   79.00   FINISH   88.00

    ATMOSPHERIC PRESSURE:              START   29.80   FINISH   29.00

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0094

    RELATIVE HUMIDITY:                    43.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  154.44,  FLOW RATE, LITERS/MIN:    5.00

    SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   6

COMMENTS:

FINAL RUN


  CLOCK      TEST          POWER                   ENGINE              MEASURED    GAS GEN     CALC      COMPRESSOR    ENGINE     TURBINE
  TIME       MODE     THRUST,LBS  PERCENT          SPEED                 FUEL     AIR FLOW     F/A      DISCHARGE    PRESSURE     INLET
                          OR       RATED            RPM                  FLOW      LB/SEC                  TEMP        RATIO       TEMP
                         SHP       T.O.        N1           N2          LB/HR                           DEGREES F      EPR      DEGREES F

  -0.00      1/ 0      257.00        5     13500.00       -0.00        732.00      30.60    0.006600      -0.00        -0.00      1075.00
  -0.00      2/ 1     2671.30       58     13800.00       -0.00       1572.00      30.64    0.014300      -0.00        -0.00      1610.00
  -0.00      3/ 2     3853.70       83     13800.00       -0.00       1980.00      30.21    0.018200      -0.00        -0.00      1850.00
  -0.00      5/ 3     4247.80       92     13400.00       -0.00       2190.00      30.07    0.020200      -0.00        -0.00      1970.00
  -0.00      6/ 5     1157.20       25     14300.00       -0.00       1080.00      28.13    0.010700      -0.00        -0.00      1375.00
  -0.00      7/ 6      786.70       17     13400.00       -0.00        916.00      30.37    0.008500      -0.00        -0.00      1220.00


  POWER     EXHAUST      EXHAUST        CO          CO        THC       NO         NO         NO      ALDEHYDES   SMOKE   PARTICULATES
 PERCENT      GAS          GAS        (DRY)          2       (WET)    (DRY)         2          X
  RATED      TEMP       PRESSURE       PPMV       (DRY)      PPMV      PPMV      (DRY)      (DRY)
  T.O.     DEGREES F      PSIA                  PERCENT V                        PPMV       PPMV

    5       -0.00        -0.00        55.00       1.35      23.00     -0.00     -0.00      29.00      -0.00      56.00      -0.00
   58       -0.00        -0.00        32.00       3.12      11.00     -0.00     -0.00      94.00      -0.00      60.00      -0.00
   83       -0.00        -0.00        34.00       3.66      10.00     -0.00     -0.00     126.00      -0.00      60.00      -0.00
   92       -0.00        -0.00        35.00       4.19      10.00     -0.00     -0.00     160.00      -0.00      58.00      -0.00
   25       -0.00        -0.00        35.00       2.50      30.00     -0.00     -0.00      76.00      -0.00      59.00      -0.00
   17       -0.00        -0.00        49.30       2.03      10.00     -0.00     -0.00      42.00      -0.00      58.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    5        8.11      1.97     -0.00    3126.39    -0.00      7.02      5.93      1.44     -0.00    2288.52    -0.00      5.14
   58        2.05      0.42     -0.00    3140.16    -0.00      9.89      3.22      0.65     -0.00    4936.33    -0.00     15.55
   83        1.46      0.32     -0.00    3140.72    -0.00     11.30      3.68      0.64     -0.00    6218.62    -0.00     22.38
   92        1.67      0.28     -0.00    3141.12    -0.00     12.54      3.66      0.62     -0.00    6879.05    -0.00     27.46
   25        2.79      1.41     -0.00    3136.28    -0.00      9.97      3.02      1.52     -0.00    3387.18    -0.00     10.76
   17        4.82      0.57     -0.00    3135.38    -0.00      6.78      4.41      0.53     -0.00    2872.01    -0.00      6.71


  POWER         CO               CO               THC               NO               NO               NO
 PERCENT                          2                                                   2                X
  RATED     LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR
  T.O.

    5          23.089          8904.738           5.604           -0.000           -0.000           19.997
   58           1.206          1847.914           0.245           -0.000           -0.000            5.820
   83           0.954          1613.675           0.167           -0.000           -0.000            5.807
   92           0.861          1619.440           0.147           -0.000           -0.000            6.465
   25           2.604          2927.048           1.312           -0.000           -0.000            9.302
   17           5.608          3650.773           0.669           -0.000           -0.000            7.996
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    CAL ID NUMBER:   25   ENGINE TYPE AND MODEL: T56-A15               SERIAL NUMBER:   8508

TEST ORGANIZATION:  ALLISON DIVISION

   MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     CO      FUEL    LB CO /    ENERGY   LB CO /
             POWER        HP       RATE      RATE    WT FACTOR    MODE     MASS     MASS   1K LB FUEL   HP-HR    HP-HR
                                  LB/HR     LB/HR                 MIN.     LBS.     LBS.

TAXI-IDLE   0.030        137.7    5.637    648.213    1.000      19.00    1.785   205.27     8.696      43.61   0.04093
TAKEOFF     1.000       4591.0    4.140   2401.677    1.000       0.50    0.034    20.01     1.724      38.26   0.00090
CLIMBOUT    0.900       4131.9    3.825   2167.244    1.000       2.50    0.159    90.30     1.765     172.16   0.00093
APPROACH    0.300       1377.3    2.946   1141.898    1.000       4.50    0.221    85.64     2.580     103.30   0.00214
TAXI-IDLE   0.030        137.7    5.637    648.213    1.000       7.00    0.658    75.62     8.696      16.07   0.04093

                        TOTAL FOR CYCLE:                                  2.857   476.85               373.40
                        LBS POLLUTANT/1K LB FUEL/CYCLE:                   5.992
                        LBS POLLUTANT/1K HP-HR/CYCLE:                     7.653
                        LBS POLLUTANT/1000K HP AT T.O.:                   0.751


   MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     HC      FUEL    LB HC /    ENERGY   LB HC /
             POWER        HP       RATE      RATE    WT FACTOR    MODE     MASS     MASS   1K LB FUEL   HP-HR    HP-HR
                                  LB/HR     LB/HR                 MIN.     LBS.     LBS.

TAXI-IDLE   0.030        137.7    1.984    648.213    1.000      19.00    0.628   205.27     3.060      43.61   0.01440
TAKEOFF     1.000       4591.0    2.211   2401.677    1.000       0.50    0.018    20.01     0.921      38.26   0.00048
CLIMBOUT    0.900       4131.9    1.972   2167.244    1.000       2.50    0.082    90.30     0.910     172.16   0.00048
APPROACH    0.300       1377.3    0.966   1141.898    1.000       4.50    0.072    85.64     0.846     103.30   0.00070
TAXI-IDLE   0.030        137.7    1.984    648.213    1.000       7.00    0.231    75.62     3.060      16.07   0.01440

                        TOTAL FOR CYCLE:                                  1.033   476.85               373.40
                        LBS POLLUTANT/1K LB FUEL/CYCLE:                   2.165
                        LBS POLLUTANT/1K HP-HR/CYCLE:                     2.765
                        LBS POLLUTANT/1000K HP AT T.O.:                   4.014


   MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN    NOX      FUEL    LB NOX/    ENERGY   LB NOX/
             POWER        HP       RATE      RATE    WT FACTOR    MODE     MASS     MASS   1K LB FUEL   HP-HR    HP-HR
                                  LB/HR     LB/HR                 MIN.     LBS.     LBS.

TAXI-IDLE   0.030        137.7    2.308    648.213    1.000      19.00    0.731   205.27     3.561      43.61   0.01676
TAKEOFF     1.000       4591.0   61.740   2401.677    1.000       0.50    0.514    20.01    25.707      38.26   0.01345
CLIMBOUT    0.900       4131.9   25.617   2167.244    1.000       2.50    1.067    90.30    11.820     172.16   0.00620
APPROACH    0.300       1377.3    9.331   1141.898    1.000       4.50    0.700    85.64     8.172     103.30   0.00678
TAXI-IDLE   0.030        137.7    2.308    648.213    1.000       7.00    0.269    75.62     3.561      16.07   0.01676

                        TOTAL FOR CYCLE:                                  3.282   476.85               373.40
                        LBS POLLUTANT/1K LB FUEL/CYCLE:                   6.883
                        LBS POLLUTANT/1K HP-HR/CYCLE:                     8.789
                        LBS POLLUTANT/1000K HP AT T.O.:                 112.067
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DATE:   6/24/71

TEST ORGANIZATION:  ALLISON DIVISION

ENGINE SUPPLIER:    ALLISON DIVISION

ENGINE DATA ****************************************************************************************************

    CAL ID NUMBER:   26    ENGINE TYPE AND MODEL:  T56-A15                    SERIAL NUMBER:    8507

                          RATED HORSEPOWER:     4591.

    ENGINE TOTAL TIME:                                  0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                        0. HRS
         N2 COMPRESSOR OVERHAUL:                        0. HRS
         COMBUSTOR CAN REPLACEMENT:                     0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
         N1 TURBINE OVERHAUL:                           0. HRS
         N2 TURBINE OVERHAUL:                           0. HRS

    FUEL: JP-5                FUEL H/C RATIO:   1.970

 OPERATIONAL DATA ********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   82.00   FINISH   89.00

     ATMOSPHERIC PRESSURE:              START   28.70   FINISH   28.90

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0092

     RELATIVE HUMIDITY:                   38.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  154.44,  FLOW RATE, LITERS/MIN:     5.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:  10

 COMMENTS:

 FINAL RUN


  CLOCK      TEST          POWER                     ENGINE              MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
  TIME       MODE     THRUST,LBS  PERCENT            SPEED                FUEL      AIR FLOW      F/A     DISCHARGE    PRESSURE      INLET
                          OR        RATED             RPM                 FLOW       LB/SEC                  TEMP        RATIO        TEMP
                          SHP       T.O.         N1            N2         LB/HR                           DEGREES F      EPR      DEGREES F

  -0.00     1/ 0       235.60         5    13500.00       -0.00        720.00     30.29    0.006600      -0.00        -0.00      1075.00
  -0.00     2/ 1      2539.90        55    13800.00       -0.00       1550.00     30.00    0.014400      -0.00        -0.00      1610.00
  -0.00     3/ 2      3591.00        78    13800.00       -0.00       1950.00     29.86    0.018100      -0.00        -0.00      1850.00
  -0.00     4/ 3      3875.60        84    13900.00       -0.00       2080.00     29.72    0.019400      -0.00        -0.00      1920.00
  -0.00     5/ 4      4116.50        89    13800.00       -0.00       2170.00     29.65    0.020300      -0.00        -0.00      1970.00
  -0.00     7/ 5       829.10        18    13400.00       -0.00        910.00     29.86    0.008500      -0.00        -0.00      1225.00
  -0.00     9/ 7      4116.50        89    13800.00       -0.00       2170.00     29.65    0.020300      -0.00        -0.00      1970.00
  -0.00    11/ 9       829.10        18    13400.00       -0.00        908.00     29.86    0.008400      -0.00        -0.00      1220.00
  -0.00    14/11        95.20         2    10000.00       -0.00        576.00     20.08    0.008000      -0.00        -0.00      1205.00
  -0.00    15/14       235.60         5    13500.00       -0.00        720.00     29.80    0.006700      -0.00        -0.00      1090.00


  POWER     EXHAUST      EXHAUST          CO          CO           THC        NO          NO          NO       ALDEHYDES   SMOKE   PARTICULATES
 PERCENT      GAS          GAS          (DRY)          2          (WET)      (DRY)         2           X
  RATED       TEMP       PRESSURE        PPMV        (DRY)        PPMV       PPMV        (DRY)       (DRY)
  T.O.     DEGREES F       PSIA                     PERCENT V                             PPMV        PPMV

    5        -0.00        -0.00         60.00        2.14        45.00      -0.00       -0.00        32.00      -0.00       52.00     -0.00
   55        -0.00        -0.00         34.00        3.16         3.00      -0.00       -0.00        92.00      -0.00       56.00     -0.00
   78        -0.00        -0.00         36.00        4.27         3.00      -0.00       -0.00       120.00      -0.00       57.00     -0.00
   84        -0.00        -0.00         37.00        4.27         3.00      -0.00       -0.00       108.00      -0.00       58.00     -0.00
   89        -0.00        -0.00         40.00        4.49         3.00      -0.00       -0.00       132.00      -0.00       55.00     -0.00
   18        -0.00        -0.00         54.00        2.14         3.00      -0.00       -0.00        51.00      -0.00       54.00     -0.00
   89        -0.00        -0.00         42.00        4.61         3.00      -0.00       -0.00       150.00      -0.00       55.00     -0.00
   18        -0.00        -0.00         54.00        2.14         3.00      -0.00       -0.00        51.00      -0.00       54.00     -0.00
    2        -0.00        -0.00        390.00        2.83       400.00      -0.00       -0.00        32.00      -0.00       43.00     -0.00
    5        -0.00        -0.00         67.00        1.75         3.00      -0.00       -0.00        34.00      -0.00       52.00     -0.00


  POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
  RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K     LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    5        5.58       2.45      -0.00     3129.03     -0.00       4.89       4.02       1.76      -0.00     2252.90     -0.00       3.52
   55        2.02       0.11      -0.00     3141.06     -0.00       9.01       3.14       0.16      -0.00     4868.63     -0.00      12.42
   78        1.69       0.08      -0.00     3141.65     -0.00       9.21       3.29       0.16      -0.00     6126.21     -0.00      18.00
   84        1.73       0.08      -0.00     3141.57     -0.00       8.31       3.60       0.17      -0.00     6534.46     -0.00      17.28
   89        1.78       0.08      -0.00     3141.51     -0.00       9.65       3.87       0.17      -0.00     6817.07     -0.00      20.95
   18        5.04       0.16      -0.00     3136.16     -0.00       7.81       4.58       0.15      -0.00     2853.91     -0.00       7.11
   89        1.32       0.08      -0.00     3141.45     -0.00      10.69       3.95       0.17      -0.00     6816.94     -0.00      23.19
   18        5.04       0.15      -0.00     3136.16     -0.00       7.81       4.57       0.15      -0.00     2847.63     -0.00       7.09
    2       26.42      16.20      -0.00     3057.94     -0.00       3.61      15.45       9.33      -0.00     1761.37     -0.00       2.08
    5        7.63       0.20      -0.00     3131.99     -0.00       6.36       5.49       0.14      -0.00     2255.03     -0.00       4.58


  POWER           CO                  CO                  THC                 NO                  NO                 NO
 PERCENT                               2                                                           2                  X
  RATED      LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR         LB/1K HP-HR
  T.O.
                                                                                                                  14.948
    5           17.263             9562.414              7.484              -0.000              -0.000             4.390
   55            1.235             1916.861              0.064              -0.000              -0.000             5.012
   78            0.915             1705.989              0.046              -0.000              -0.000             4.458
   84            0.930             1686.053              0.045              -0.000              -0.000             5.090
   89            0.939             1655.035              0.042              -0.000              -0.000             8.576
   18            5.528             3442.174              0.180              -0.000              -0.000             5.633
   89            0.969             1656.005              0.041              -0.000              -0.000             8.557
   18            5.516             3434.609              0.179              -0.000              -0.000            21.871
    2          162.276            14501.820             98.016              -0.000              -0.000            19.440
    5           23.323             9571.445              0.608              -0.000              -0.000
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     CAL ID NUMBER:   26   ENGINE TYPE AND MODEL: T56-A15                  SERIAL NUMBER:   8507

TEST ORGANIZATION:  ALLISON DIVISION

   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     CO         FUEL     LB CO /    ENERGY   LB CO /
              POWER        HP      RATE      RATE     WT FACTOR   MODE      MASS        MASS   1K LB FUEL    HP-HR    HP-HR
                                  LB/HR      LB/HR                MIN.      LBS.        LBS.

TAXI-IDLE    0.030       137.7    8.970    456.065    1.000      19.00     2.840      144.42     19.668      43.61   0.06513
TAKEOFF      1.000      4591.0    4.270   2434.323    1.000       0.50     0.036       20.29      1.754      38.26   0.00093
CLIMBOUT     0.900      4131.9    3.738   2200.739    1.000       2.50     0.156       91.70      1.699     172.16   0.00090
APPROACH     0.300      1377.3    4.223   1158.112    1.000       4.50     0.317       86.86      3.646     103.30   0.00307
TAXI-IDLE    0.030       137.7    8.970    456.065    1.000       7.00     1.046       53.21     19.668      16.07   0.06513

                                 TOTAL FOR CYCLE:                          4.395      396.47                373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:          11.085
                                 LBS POLLUTANT/1K HP-HR/CYCLE:            11.770
                                 LBS POLLUTANT/1000K HP AT T.O.:           0.775


   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     HC         FUEL     LB HC /    ENERGY   LB HC /
              POWER        HP      RATE      RATE     WT FACTOR   MODE      MASS        MASS   1K LB FUEL    HP-HR    HP-HR
                                  LB/HR      LB/HR                MIN.      LBS.        LBS.

TAXI-IDLE    0.030       137.7    9.176    456.065    1.000      19.00     2.906      144.42     20.120      43.61   0.06662
TAKEOFF      1.000      4591.0    0.0     2434.323    1.000       0.50     0.0         20.29      0.0        38.26   0.0
CLIMBOUT     0.900      4131.9    0.030   2200.739    1.000       2.50     0.001       91.70      0.014     172.16   0.00001
APPROACH     0.300      1377.3    0.124   1158.112    1.000       4.50     0.009       86.86      0.107     103.30   0.00009
TAXI-IDLE    0.030       137.7    9.176    456.065    1.000       7.00     1.071       53.21     20.120      16.07   0.06662

                                 TOTAL FOR CYCLE:                          3.987      396.47                373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:          10.056
                                 LBS POLLUTANT/1K HP-HR/CYCLE:            10.677
                                 LBS POLLUTANT/1000K HP AT T.O.:           0.0


   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN    NOX         FUEL     LB NOX/    ENERGY   LB NOX/
              POWER        HP      RATE      RATE     WT FACTOR   MODE      MASS        MASS   1K LB FUEL    HP-HR    HP-HR
                                  LB/HR      LB/HR                MIN.      LBS.        LBS.

TAXI-IDLE    0.030       137.7    1.636    456.065    1.000      19.00     0.518      144.42      3.588      43.61   0.01188
TAKEOFF      1.000      4591.0   23.695   2434.323    1.000       0.50     0.197       20.29      9.734      38.26   0.00516
CLIMBOUT     0.900      4131.9   21.150   2200.739    1.000       2.50     0.881       91.70      9.610     172.16   0.00512
APPROACH     0.300      1377.3    6.582   1158.112    1.000       4.50     0.494       86.86      5.683     103.30   0.00478
TAXI-IDLE    0.030       137.7    1.636    456.065    1.000       7.00     0.191       53.21      3.588      16.07   0.01188

                                 TOTAL FOR CYCLE:                          2.281      396.47                373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           5.754
                                 LBS POLLUTANT/1K HP-HR/CYCLE:             6.110
                                 LBS POLLUTANT/1000K HP AT T.O.:          43.010
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DATE: 6/21/71

TEST ORGANIZATION: ALLISON DIVISION

ENGINE SUPPLIER: ALLISON DIVISION

ENGINE DATA **

CAL ID NUMBER: 27 ENGINE TYPE AND MODEL: T56-A15 SERIAL NUMBER: 8510

RATED HORSEPOWER: 4591.

ENGINE TOTAL TIME: 0. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 0. HRS
N2 COMPRESSOR OVERHAUL: 0. HRS
COMBUSTOR CAN REPLACEMENT: 0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 0. HRS
N1 TURBINE OVERHAUL: 0. HRS
N2 TURBINE OVERHAUL: 0. HRS

FUEL: JP-5 FUEL H/C RATIO: 1.970

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 76.00 FINISH 84.00

ATMOSPHERIC PRESSURE: START 28.60 FINISH 28.90

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0118

RELATIVE HUMIDITY: 60.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 154.44, FLOW RATE, LITERS/MIN: 5.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 6

COMMENTS:

FINAL RUN

CLOCK TIME	TEST MODE	POWER THRUST, LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
-0.00	1/ 0	235.60	5	13500.00	-0.00	720.00	30.60	0.006500	-0.00	-0.00	1055.00
-0.00	2/ 1	2715.10	59	13800.00	-0.00	1570.00	30.53	0.014300	-0.00	-0.00	1610.00
-0.00	3/ 2	3809.90	82	13800.00	-0.00	2000.00	30.32	0.018300	-0.00	-0.00	1850.00
-0.00	5/ 3	4335.40	94	13800.00	-0.00	2210.00	30.29	0.020300	-0.00	-0.00	1970.00
-0.00	6/ 5	1111.80	24	14300.00	-0.00	1041.00	28.25	0.010200	-0.00	-0.00	1365.00
-0.00	7/ 6	871.70	18	13400.00	-0.00	899.00	30.25	0.008300	-0.00	-0.00	1210.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PPMV	CO_2 (DRY) PERCENT V	THC (WET) PPMV	NO (DRY) PPMV	NO_2 (DRY) PPMV	NO_x (DRY) PPMV	ALDEHYDES	SMOKE	PARTICULATES
5	-0.00	-0.00	49.00	1.63	26.00	-0.00	-0.00	31.00	-0.00	53.00	-0.00
59	-0.00	-0.00	34.00	3.52	11.00	-0.00	-0.00	74.00	-0.00	57.00	-0.00
82	-0.00	-0.00	35.00	4.45	2.00	-0.00	-0.00	107.00	-0.00	60.00	-0.00
94	-0.00	-0.00	39.00	4.38	3.00	-0.00	-0.00	100.00	-0.00	58.00	-0.00
24	-0.00	-0.00	33.00	3.18	2.00	-0.00	-0.00	82.00	-0.00	58.00	-0.00
18	-0.00	-0.00	52.00	2.22	1.00	-0.00	-0.00	31.00	-0.00	57.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
5	5.99	1.85	-0.00	3130.04	-0.00	6.22	4.31	1.33	-0.00	2253.63	-0.00	4.48
59	1.93	0.37	-0.00	3140.48	-0.00	6.90	3.03	0.58	-0.00	4930.54	-0.00	10.84
82	1.57	0.05	-0.00	3141.91	-0.00	7.53	3.15	0.11	-0.00	6283.81	-0.00	15.06
94	1.73	0.08	-0.00	3141.57	-0.00	7.50	3.83	0.18	-0.00	6942.88	-0.00	16.57
24	2.07	0.07	-0.00	3141.06	-0.00	8.47	2.16	0.08	-0.00	3269.44	-0.00	8.81
18	4.68	0.05	-0.00	3137.03	-0.00	4.58	4.20	0.05	-0.00	2820.19	-0.00	4.12

POWER PERCENT RATED T.O.	CO LB/1K HP-HR	CO_2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO_2 LB/1K HP-HR	NO_x LB/1K HP-HR
5	18.301	9565.506	5.651	-0.000	-0.000	19.018
59	1.116	1815.971	0.214	-0.000	-0.000	3.991
82	0.826	1649.337	0.028	-0.000	-0.000	3.957
94	0.884	1601.439	0.042	-0.000	-0.000	3.822
24	1.942	2941.036	0.070	-0.000	-0.000	7.928
18	4.923	3235.279	0.054	-0.000	-0.000	4.723

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     CAL ID NUMBER:   27   ENGINE TYPE AND MODEL: T56-A15              SERIAL NUMBER:   8510

TEST ORGANIZATION:  ALLISON DIVISION

   MODE    FRACTIONAL    POWER   EMISSION      FUEL        USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY   LB CO /
             POWER        HP       RATE        RATE     WT FACTOR     MODE       MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR       LB/HR                   MIN.       LBS.       LBS.

TAXI-IDLE   0.030       137.7     3.380     397.675     1.000       19.00      1.070     125.93      8.500      43.61    0.02454
TAKEOFF     1.000      4591.0     3.777    2306.891     1.000        0.50      0.031      19.22      1.637      38.26    0.00082
CLIMBOUT    0.900      4131.9     3.279    2104.478     1.000        2.50      0.137      87.69      1.558     172.16    0.00079
APPROACH    0.300      1377.3     2.179    1139.468     1.000        4.50      0.163      85.46      1.912     103.30    0.00158
TAXI-IDLE   0.030       137.7     3.380     397.675     1.000        7.00      0.394      46.40      8.500      16.07    0.02454

                                TOTAL FOR CYCLE:                               1.796     364.70                373.40
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                4.925
                                LBS POLLUTANT/1K HP-HR/CYCLE:                  4.811
                                LBS POLLUTANT/1000K HP AT T.O.:                0.686


   MODE    FRACTIONAL    POWER   EMISSION      FUEL        USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY   LB HC /
             POWER        HP       RATE        RATE     WT FACTOR     MODE       MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR       LB/HR                   MIN.       LBS.       LBS.

TAXI-IDLE   0.030       137.7     1.312     397.675     1.000       19.00      0.416     125.93      3.300      43.61    0.00953
TAKEOFF     1.000      4591.0     0.089    2306.891     1.000        0.50      0.001      19.22      0.039      38.26    0.00002
CLIMBOUT    0.900      4131.9     0.096    2104.478     1.000        2.50      0.004      87.69      0.046     172.16    0.00002
APPROACH    0.300      1377.3     0.081    1139.468     1.000        4.50      0.006      85.46      0.071     103.30    0.00006
TAXI-IDLE   0.030       137.7     1.312     397.675     1.000        7.00      0.153      46.40      3.300      16.07    0.00953

                                TOTAL FOR CYCLE:                               0.579     364.70                373.40
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                1.589
                                LBS POLLUTANT/1K HP-HR/CYCLE:                  1.552
                                LBS POLLUTANT/1000K HP AT T.O.:                0.161


   MODE    FRACTIONAL    POWER   EMISSION      FUEL        USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY   LB NOX/
             POWER        HP       RATE        RATE     WT FACTOR     MODE       MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR       LB/HR                   MIN.       LBS.       LBS.

TAXI-IDLE   0.030       137.7     0.282     397.675     1.000       19.00      0.089     125.93      0.710      43.61    0.00205
TAKEOFF     1.000      4591.0    17.370    2306.891     1.000        0.50      0.145      19.22      7.529      38.26    0.00378
CLIMBOUT    0.900      4131.9    15.906    2104.478     1.000        2.50      0.663      87.69      7.558     172.16    0.00385
APPROACH    0.300      1377.3     6.038    1139.468     1.000        4.50      0.453      85.46      5.299     103.30    0.00438
TAXI-IDLE   0.030       137.7     0.282     397.675     1.000        7.00      0.033      46.40      0.710      16.07    0.00205

                                TOTAL FOR CYCLE:                               1.383     364.70                373.40
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                3.791
                                LBS POLLUTANT/1K HP-HR/CYCLE:                  3.703
                                LBS POLLUTANT/1000K HP AT T.O.:               31.528
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DATE: 6/18/71

TEST ORGANIZATION: ALLISON DIVISION

ENGINE SUPPLIER: ALLISON DIVISION

ENGINE DATA **

CAL ID NUMBER: 28 ENGINE TYPE AND MODEL: T56-A15 SERIAL NUMBER: 8469

RATED HORSEPOWER: 4591.

ENGINE TOTAL TIME: 0. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	0. HRS
N2 COMPRESSOR OVERHAUL:	0. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	0. HRS
N1 TURBINE OVERHAUL:	0. HRS
N2 TURBINE OVERHAUL:	0. HRS

FUEL: JP-5 FUEL H/C RATIO: 1.970

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 89.00 FINISH 93.00

ATMOSPHERIC PRESSURE: START 28.80 FINISH 29.00

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0102

RELATIVE HUMIDITY: 34.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 154.44, FLOW RATE, LITERS/MIN: 5.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 8

COMMENTS:

FINAL RUN

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
-0.00	1/ 0	257.00	5	13500.00	-0.00	732.00	29.90	0.006800	-0.00	-0.00	1105.00
-0.00	2/ 1	2496.20	54	13800.00	-0.00	1512.00	-0.00	0.014100	-0.00	-0.00	1610.00
-0.00	3/ 2	3525.30	76	13800.00	-0.00	1925.00	29.90	0.017900	-0.00	-0.00	1850.00
-0.00	4/ 3	3744.20	81	13800.00	-0.00	2020.00	29.83	0.018800	-0.00	-0.00	1920.00
-0.00	5/ 4	3919.40	85	13800.00	-0.00	2090.00	29.76	0.019500	-0.00	-0.00	1970.00
-0.00	6/ 5	975.60	21	14300.00	-0.00	1040.00	27.05	0.010700	-0.00	-0.00	1410.00
-0.00	7/ 6	850.50	18	13400.00	-0.00	918.00	29.65	0.008600	-0.00	-0.00	1255.00
-0.00	9/ 7	3919.40	85	13800.00	-0.00	2100.00	29.83	0.019600	-0.00	-0.00	1970.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PPMV	CO_2 (DRY) PERCENT V	THC (WET) PPMV	NO (DRY) PPMV	NO_2 (DRY) PPMV	NO_x (DRY) PPMV	ALDEHYDES	SMOKE	PARTICULATES
5	-0.00	-0.00	55.00	1.55	15.00	-0.00	-0.00	30.00	-0.00	50.00	-0.00
54	-0.00	-0.00	32.00	3.28	9.00	-0.00	-0.00	108.00	-0.00	52.00	-0.00
76	-0.00	-0.00	34.00	4.10	3.00	-0.00	-0.00	129.00	-0.00	54.00	-0.00
81	-0.00	-0.00	32.00	4.65	2.00	-0.00	-0.00	129.00	-0.00	54.00	-0.00
85	-0.00	-0.00	35.00	4.71	4.00	-0.00	-0.00	153.00	-0.00	54.00	-0.00
21	-0.00	-0.00	35.00	2.75	3.00	-0.00	-0.00	77.00	-0.00	53.00	-0.00
18	-0.00	-0.00	49.00	2.13	1.00	-0.00	-0.00	42.00	-0.00	52.00	-0.00
85	-0.00	-0.00	38.00	4.42	4.00	-0.00	-0.00	153.00	-0.00	54.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
5	7.07	1.12	-0.00	3130.34	-0.00	6.33	5.17	0.82	-0.00	2291.41	-0.00	4.64
54	1.95	0.32	-0.00	3140.57	-0.00	10.81	2.95	0.49	-0.00	4748.54	-0.00	16.35
76	1.66	0.09	-0.00	3141.68	-0.00	10.33	3.19	0.17	-0.00	6047.73	-0.00	19.89
81	1.38	0.05	-0.00	3142.22	-0.00	9.11	2.78	0.10	-0.00	6347.28	-0.00	18.41
85	1.49	0.10	-0.00	3141.91	-0.00	10.67	3.11	0.21	-0.00	6566.59	-0.00	22.30
21	2.54	0.13	-0.00	3140.18	-0.00	9.19	2.65	0.13	-0.00	3265.78	-0.00	9.56
18	4.59	0.05	-0.00	3137.16	-0.00	6.47	4.22	0.05	-0.00	2879.91	-0.00	5.94
85	1.72	0.11	-0.00	3141.53	-0.00	11.37	3.61	0.23	-0.00	6597.20	-0.00	23.87

POWER PERCENT RATED T.O.	CO LB/1K HP-HR	CO_2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO_2 LB/1K HP-HR	NO_x LB/1K HP-HR
5	20.136	8915.992	3.193	-0.000	-0.000	18.040
54	1.181	1902.307	0.196	-0.000	-0.000	6.548
76	0.905	1715.522	0.048	-0.000	-0.000	5.643
81	0.742	1695.231	0.028	-0.000	-0.000	4.916
85	0.792	1675.406	0.054	-0.000	-0.000	5.689
21	2.712	3347.461	0.137	-0.000	-0.000	9.798
18	4.958	3386.135	0.059	-0.000	-0.000	6.980
85	0.921	1683.218	0.058	-0.000	-0.000	6.091

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    CAL ID NUMBER:   28   ENGINE TYPE AND MODEL: T56-A15                SERIAL NUMBER:   8469
TEST ORGANIZATION:  ALLISON DIVISION

  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     CO         FUEL     LB CO /     ENERGY   LB CO /
            POWER        HP       RATE      RATE     WT FACTOR    MODE      MASS        MASS   1K LB FUEL    HP-HR     HP-HR
                                 LB/HR      LB/HR                 MIN.      LBS.        LBS.

TAXI-IDLE   0.030       137.7    4.215     576.838    1.000      19.00     1.335      182.67      7.307      43.61   0.03060
TAKEOFF     1.000      4591.0    2.583    2387.875    1.000       0.50     0.022       19.90      1.082      38.26   0.00056
CLIMBOUT    0.900      4131.9    2.823    2186.542    1.000       2.50     0.118       91.11      1.291     172.16   0.00068
APPROACH    0.300      1377.3    2.521    1144.479    1.000       4.50     0.189       85.84      2.203     103.30   0.00183
TAXI-IDLE   0.030       137.7    4.215     576.838    1.000       7.00     0.492       67.30      7.307      16.07   0.03060

                                 TOTAL FOR CYCLE:                          2.155      446.80                 373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           4.822
                                 LBS POLLUTANT/1K HP-HR/CYCLE:             5.770
                                 LBS POLLUTANT/1000K HP AT T.O.:           0.469


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     HC         FUEL     LB HC /     ENERGY   LB HC /
            POWER        HP       RATE      RATE     WT FACTOR    MODE      MASS        MASS   1K LB FUEL    HP-HR     HP-HR
                                 LB/HR      LB/HR                 MIN.      LBS.        LBS.

TAXI-IDLE   0.030       137.7    2.087     576.838    1.000      19.00     0.661      182.67      3.618      43.61   0.01515
TAKEOFF     1.000      4591.0    0.310    2387.875    1.000       0.50     0.003       19.90      0.130      38.26   0.00007
CLIMBOUT    0.900      4131.9    0.249    2186.542    1.000       2.50     0.010       91.11      0.114     172.16   0.00006
APPROACH    0.300      1377.3    0.123    1144.479    1.000       4.50     0.009       85.84      0.107     103.30   0.00009
TAXI-IDLE   0.030       137.7    2.087     576.838    1.000       7.00     0.243       67.30      3.618      16.07   0.01515

                                 TOTAL FOR CYCLE:                          0.927      446.80                 373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           2.074
                                 LBS POLLUTANT/1K HP-HR/CYCLE:             2.481
                                 LBS POLLUTANT/1000K HP AT T.O.:           0.563


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY   LB NOX/
            POWER        HP       RATE      RATE     WT FACTOR    MODE      MASS        MASS   1K LB FUEL    HP-HR     HP-HR
                                 LB/HR      LB/HR                 MIN.      LBS.        LBS.

TAXI-IDLE   0.030       137.7    1.975     576.838    1.000      19.00     0.625      182.67      3.423      43.61   0.01434
TAKEOFF     1.000      4591.0   26.544    2387.875    1.000       0.50     0.221       19.90     11.116      38.26   0.00578
CLIMBOUT    0.900      4131.9   23.634    2186.542    1.000       2.50     0.985       91.11     10.809     172.16   0.00572
APPROACH    0.300      1377.3    8.856    1144.479    1.000       4.50     0.664       85.84      7.738     103.30   0.00643
TAXI-IDLE   0.030       137.7    1.975     576.838    1.000       7.00     0.230       67.30      3.423      16.07   0.01434

                                 TOTAL FOR CYCLE:                          2.726      446.80                 373.40
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           6.101
                                 LBS POLLUTANT/1K HP-HR/CYCLE:             7.300
                                 LBS POLLUTANT/1000K HP AT T.O.:          48.182
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DATE:   5/ 6/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA *****************************************************************************************************************

    CAL ID NUMBER:   34    ENGINE TYPE AND MODEL:  T76-G-410                  SERIAL NUMBER:    GE00790

                           RATED HORSEPOWER:      720.

    ENGINE TOTAL TIME:                                        0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                          0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                              0. HRS
         N2 COMPRESSOR OVERHAUL:                              0. HRS
         COMBUSTOR CAN REPLACEMENT:                           0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:              0. HRS
         N1 TURBINE OVERHAUL:                                 0. HRS
         N2 TURBINE OVERHAUL:                                 0. HRS

    FUEL: JP-5                   FUEL H/C RATIO:   1.877

OPERATIONAL DATA ****************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   59.00   FINISH   59.00

    ATMOSPHERIC PRESSURE:              START   28.61   FINISH   28.61

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0066

    RELATIVE HUMIDITY:                   42.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

    SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

 NUMBER OF TESTS:    6

 COMMENTS:


                                                                                                                TURBINE
                                                                                     COMPRESSOR    ENGINE        INLET
 CLOCK    TEST        POWER                ENGINE          MEASURED  GAS GEN    CALC  DISCHARGE    PRESSURE      TEMP
 TIME     MODE   THRUST,LBS  PERCENT       SPEED            FUEL    AIR FLOW    F/A     TEMP        RATIO      DEGREES F
                     OR       RATED         RPM             FLOW     LB/SEC           DEGREES F      EPR
                     SHP      T.O.     N1         N2        LB/HR

 -0.00    1/ 0       2.10      0    27230.00    -0.00      71.00      2.68   0.007700    -0.00       -0.00        -0.00
 -0.00    2/ 1     142.80     19    41730.00    -0.00     192.00      6.50   0.008600    -0.00       -0.00        -0.00
 -0.00    6/ 2     282.40     39    41730.00    -0.00     238.00      6.47   0.010700    -0.00       -0.00        -0.00
 -0.00   11/ 6     431.60     59    41730.00    -0.00     293.00      6.45   0.013200    -0.00       -0.00        -0.00
 -0.00   16/11     571.20     79    41730.00    -0.00     347.00      6.38   0.015800    -0.00       -0.00        -0.00
 -0.00   20/16     666.40     92    41730.00    -0.00     387.00      6.33   0.017800    -0.00       -0.00        -0.00


                                                                              NO       ALDEHYDES   SMOKE   PARTICULATES
 POWER    EXHAUST    EXHAUST        CO       CO        THC      NO      NO      X
 PERCENT    GAS        GAS        (WET)       2       (WET)   (WET)     2    (WET)
 RATED     TEMP      PRESSURE      PPMV     (WET)     PPMV    PPMV   (WET)    PPMV
 T.O.    DEGREES F     PSIA               PERCENT V                  PPMV

   0       673.00     -0.00      482.70     1.61    564.10    1.90   12.10    14.00     -0.00     -0.00     -0.00
  19       622.00     -0.00      223.30     1.86     91.40   12.60   29.30    42.00     -0.00     -0.00     -0.00
  39       708.00     -0.00      190.20     2.29     39.90   27.50   29.30    56.80     -0.00     -0.00     -0.00
  59       815.00     -0.00      151.50     2.45      9.20   50.70   22.10    72.80     -0.00     -0.00     -0.00
  79       930.00     -0.00       91.10     3.09      2.20   80.80   11.70    92.50     -0.00     -0.00     -0.00
  92      1010.00     -0.00       38.90     3.44      1.40   98.10    8.70   106.80     -0.00     -0.00     -0.00


                                                                                                              MASS EMI
 POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI    NOX
 PERCENT    CO        HC       NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO       LB/HR
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0      56.56     37.94      2.34   2972.55     0.37      2.70      4.02      2.70      0.17    211.05      0.03      0.19
  19      23.75      5.58      5.13   3113.11     2.20      7.35      4.56      1.07      0.98    597.72      0.42      1.41
  39      16.57      1.99      4.19   3134.24     3.93      8.13      3.94      0.47      1.00    745.95      0.94      1.93
  59      11.45      0.40      2.74   3146.65     6.29      9.04      3.35      0.12      0.80    921.97      1.84      2.65
  79       5.92      0.08      1.25   3156.20     8.63      9.88      2.06      0.03      0.43   1095.20      2.99      3.43
  92       2.28      0.05      0.84   3162.02     9.43     10.26      0.88      0.02      0.32   1223.70      3.65      3.97


                                                                           NO              NO
 POWER          CO               CO            THC            NO           2                X
 PERCENT                          2
 RATED     LB/1K HP-HR      LB/1K HP-HR     LB/1K HP-HR    LB/1K HP-HR   LB/1K HP-HR     LB/1K HP-HR
 T.O.

   0        1915.717       100500.500       1283.528        12.399        78.960          91.359
  19          31.939         4145.689          7.497         2.964         6.893           9.881
  39          13.963         2641.461          1.678         3.316         3.533           6.849
  59           7.773         2136.164          0.270         4.272         1.862           6.135
  79           3.599         1917.368          0.050         5.241         0.759           6.000
  92           1.322         1836.290          0.027         5.474         0.485           5.960
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    CAL ID NUMBER:   34   ENGINE TYPE AND MODEL: T76-G-410            SERIAL NUMBER:   GE00790

TEST ORGANIZATION:  AIRESEARCH


   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY   LB CO /
             POWER        HP       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.060        43.2     6.331     150.239     1.000      19.00      2.005      47.58     42.136      13.68    0.14654
TAKEOFF     1.000       720.0     0.281     409.537     1.000       0.50      0.002       3.41      0.687       6.00    0.00039
CLIMBOUT    0.900       648.0     1.169     380.229     1.000       2.50      0.049      15.84      3.075      27.00    0.00180
APPROACH    0.300       216.0     4.254     216.995     1.000       4.50      0.319      16.27     19.604      16.20    0.01969
TAXI-IDLE   0.060        43.2     6.331     150.239     1.000       7.00      0.739      17.53     42.136       5.04    0.14654

                                 TOTAL FOR CYCLE:                          3.113     100.63                  67.92
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:          30.937
                                 LBS POLLUTANT/1K HP-HR/CYCLE:            45.838
                                 LBS POLLUTANT/1000K HP AT T.O.:           0.326


   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY   LB HC /
             POWER        HP       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.060        43.2     2.563     150.239     1.000      19.00      0.812      47.58     17.058      13.68    0.05933
TAKEOFF     1.000       720.0     0.0       409.537     1.000       0.50      0.0         3.41      0.0         6.00    0.0
CLIMBOUT    0.900       648.0     0.009     380.229     1.000       2.50      0.000      15.84      0.025      27.00    0.00001
APPROACH    0.300       216.0     0.737     216.995     1.000       4.50      0.055      16.27      3.398      16.20    0.00341
TAXI-IDLE   0.060        43.2     2.563     150.239     1.000       7.00      0.299      17.53     17.058       5.04    0.05932

                                 TOTAL FOR CYCLE:                          1.166     100.63                  67.92
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:          11.589
                                 LBS POLLUTANT/1K HP-HR/CYCLE:            17.171
                                 LBS POLLUTANT/1000K HP AT T.O.:           0.0


   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      NOX       FUEL     LB NOX/     ENERGY   LB NOX/
             POWER        HP       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.060        43.2     0.769     150.239     1.000      19.00      0.244      47.58      5.118      13.68    0.01780
TAKEOFF     1.000       720.0     4.294     409.537     1.000       0.50      0.036       3.41     10.484       6.00    0.00596
CLIMBOUT    0.900       648.0     3.863     380.229     1.000       2.50      0.161      15.84     10.160      27.00    0.00596
APPROACH    0.300       216.0     1.681     216.995     1.000       4.50      0.126      16.27      7.746      16.20    0.00778
TAXI-IDLE   0.060        43.2     0.769     150.239     1.000       7.00      0.090      17.53      5.118       5.04    0.01780

                                 TOTAL FOR CYCLE:                          0.656     100.63                  67.92
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           6.519
                                 LBS POLLUTANT/1K HP-HR/CYCLE:             9.659
                                 LBS POLLUTANT/1000K HP AT T.O.:          49.696
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DATE:   5/11/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:   33    ENGINE TYPE AND MODEL:  TPE 331-43 A          SERIAL NUMBER:    P-61157

                            RATED HORSEPOWER:       575.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: JP-5               FUEL H/C RATIO:   1.877

OPERATIONAL DATA *************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   91.00   FINISH   91.00

     ATMOSPHERIC PRESSURE:              START   28.76   FINISH   28.76

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0044

     RELATIVE HUMIDITY:                     16.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

 NUMBER OF TESTS:   6

 COMMENTS:


                                                                                                                   TURBINE
                                                                                          COMPRESSOR    ENGINE     INLET
 CLOCK      TEST         POWER              ENGINE                MEASURED   GAS GEN      CALC     DISCHARGE   PRESSURE    TEMP
 TIME       MODE    THRUST,LBS  PERCENT      SPEED                 FUEL     AIR FLOW     F/A        TEMP       RATIO    DEGREES F
                        OR      RATED         RPM                  FLOW      LB/SEC               DEGREES F     EPR
                       SHP      T.O.        N1           N2        LB/HR

  -0.00     1/ 0       2.70        0    35535.00     -0.00        101.00     -0.00    -0.000000      -0.00       -0.00       -0.00
  -0.00     2/ 1       6.30        1    41730.00     -0.00        150.00     -0.00    -0.000000      -0.00       -0.00       -0.00
  -0.00     6/ 2     139.60       24    41730.00     -0.00        197.00     -0.00    -0.000000      -0.00       -0.00       -0.00
  -0.00    11/ 6     266.60       46    41730.00     -0.00        246.00     -0.00    -0.000000      -0.00       -0.00       -0.00
  -0.00    16/11     393.50       68    41730.00     -0.00        293.00     -0.00    -0.000000      -0.00       -0.00       -0.00
  -0.00    20/16     498.20       86    41730.00     -0.00        338.00     -0.00    -0.000000      -0.00       -0.00       -0.00


                                                                 NO        NO         NO     ALDEHYDES   SMOKE   PARTICULATES
 POWER     EXHAUST      EXHAUST         CO        CO       THC                 2          X
 PERCENT     GAS          GAS          (WET)       2      (WET)    (WET)     (WET)      (WET)
 RATED      TEMP       PRESSURE        PPMV     (WET)     PPMV     PPMV      PPMV       PPMV
 T.O.     DEGREES F      PSIA                 PERCENT V

   0       615.00       -0.00        289.60     1.54    369.00     4.60     13.20      17.80      -0.00     -0.00      -0.00
   1       620.00       -0.00        125.30     1.62     24.50    21.30     19.60      40.90      -0.00     -0.00      -0.00
  24       745.00       -0.00        125.40     2.14     12.00    37.80     25.50      63.30      -0.00     -0.00      -0.00
  46       860.00       -0.00         70.50     2.60      2.70    69.10     15.80      84.90      -0.00     -0.00      -0.00
  68       375.00       -0.00         27.20     2.93      2.10    97.30      8.00     105.30      -0.00     -0.00      -0.00
  86      1090.00       -0.00         13.60     3.40      1.60   119.10      7.30     126.40      -0.00     -0.00      -0.00


                                                                                                                   MASS EMI
                                                                               MASS EMI  MASS EMI  MASS EMI  MASS EMI    NOX
 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI    HC       NO2       CO2       NO      LB/HR
 PERCENT     CO        HC       NO2       CO2        NO       NOX        CO     LB/HR     LB/HR     LB/HR     LB/HR
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0       36.34     26.52      2.72   3035.90      0.95      3.67      3.67      2.68      0.27    306.63      0.10      0.37
   1       15.44      1.73      3.97   3136.72      4.31      8.28      2.32      0.26      0.60    470.51      0.65      1.24
  24       11.73      0.64      3.92   3145.53      5.81      9.73      2.31      0.13      0.77    619.67      1.14      1.92
  46        5.45      0.12      2.01   3156.84      8.77     10.78      1.34      0.03      0.49    776.58      2.16      2.65
  68        1.87      0.08      0.90   3162.57     10.98     11.88      0.55      0.02      0.26    926.63      3.22      3.48
  86        0.81      0.05      0.71   3164.31     11.59     12.30      0.27      0.02      0.24   1069.54      3.92      4.16


                                                                              NO                NO
 POWER         CO              CO            THC             NO                2                 X
 PERCENT                        2                                      LB/1K HP-HR       LB/1K HP-HR
 RATED     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR     LB/1K HP-HR
 T.O.

   0         1359.200      113564.825        991.874          35.462          101.761          137.223
   1          367.642       74683.813         41.170         102.651           94.460          197.114
  24           16.555        4438.891          0.907           8.157            5.529           13.726
  46            5.027        2912.914          0.110           8.053            1.851            9.944
  68            1.391        2354.845          0.062           8.175            0.672            8.847
  86            0.547        2146.805          0.037           7.862            0.482            8.343
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    CAL ID NUMBER:   33   ENGINE TYPE AND MODEL: TPE 331-43 A          SERIAL NUMBER:   P-61157

TEST ORGANIZATION:  AIRESEARCH


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY   LB CO /
            POWER         HP      RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR      LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.060        34.5     4.270     151.082     1.000      19.00      1.352      47.84    28.263      10.92    0.12377
TAKEOFF     1.000       575.0     0.081     374.446     1.000       0.50      0.001       3.12     0.216       4.79    0.00014
CLIMBOUT    0.900       517.5     0.248     349.374     1.000       2.50      0.010      14.56     0.709      21.56    0.00048
APPROACH    0.300       172.5     2.150     210.526     1.000       4.50      0.161      15.79    10.213      12.94    0.01246
TAXI-IDLF   0.060        34.5     4.270     151.082     1.000       7.00      0.498      17.63    28.263       4.02    0.12377

                                TOTAL FOR CYCLE:                              2.023      98.94                54.24
                                LBS POLLUTANT/1K LB FUEL/CYCLE:              20.443
                                LBS POLLUTANT/1K HP-HR/CYCLE:                37.289
                                LBS POLLUTANT/1000K HP AT T.O.:               0.117


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY   LB HC /
            POWER         HP      RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR      LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.060        34.5     1.506     151.082     1.000      19.00      0.477      47.84     9.971      10.92    0.04367
TAKEOFF     1.000       575.0     0.043     374.446     1.000       0.50      0.000       3.12     0.114       4.79    0.00007
CLIMBOUT    0.900       517.5     0.040     349.374     1.000       2.50      0.002      14.56     0.114      21.56    0.00008
APPROACH    0.300       172.5     0.106     210.526     1.000       4.50      0.008      15.79     0.501      12.94    0.00061
TAXI-IDLE   0.060        34.5     1.506     151.082     1.000       7.00      0.176      17.63     9.971       4.02    0.04367

                                TOTAL FOR CYCLE:                              0.663      98.94                54.24
                                LBS POLLUTANT/1K LB FUEL/CYCLE:               6.699
                                LBS POLLUTANT/1K HP-HR/CYCLE:                12.218
                                LBS POLLUTANT/1000K HP AT T.O.:               0.619


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      NOX       FUEL     LB NOX/     ENERGY   LB NOX/
            POWER         HP      RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR      LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.060        34.5     0.932     151.082     1.000      19.00      0.295      47.84     6.171      10.92    0.02703
TAKEOFF     1.000       575.0     4.749     374.446     1.000       0.50      0.040       3.12    12.682       4.79    0.00826
CLIMBOUT    0.900       517.5     4.348     349.374     1.000       2.50      0.181      14.56    12.444      21.56    0.00840
APPROACH    0.300       172.5     2.114     210.526     1.000       4.50      0.159      15.79    10.044      12.94    0.01226
TAXI-IDLE   0.060        34.5     0.932     151.082     1.000       7.00      0.109      17.63     6.171       4.02    0.02703

                                TOTAL FOR CYCLE:                              0.783      98.94                54.24
                                LBS POLLUTANT/1K LB FUEL/CYCLE:               7.918
                                LBS POLLUTANT/1K HP-HR/CYCLE:                14.442
                                LBS POLLUTANT/1000K HP AT T.O.:              68.822
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DATE:   6/ 1/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:   31    ENGINE TYPE AND MODEL:  TPE 331-151 G          SERIAL NUMBER:    P-91165

                          RATED HORSEPOWER:      590.

     ENGINE TOTAL TIME:                                    0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          0. HRS
          N2 COMPRESSOR OVERHAUL:                          0. HRS
          COMBUSTOR CAN REPLACEMENT:                       0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
          N1 TURBINE OVERHAUL:                             0. HRS
          N2 TURBINE OVERHAUL:                             0. HRS

     FUEL: AV KEROS             FUEL H/C RATIO:   1.928

OPERATIONAL DATA ****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   92.00   FINISH   92.00

     ATMOSPHERIC PRESSURE:              START   28.67   FINISH   28.67

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0028

     RELATIVE HUMIDITY:                        10.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   6

COMMENTS:


  CLOCK      TEST           POWER                 ENGINE             MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE     TURBINE
  TIME       MODE     THRUST,LBS  PERCENT          SPEED               FUEL     AIR FLOW      F/A     DISCHARGE    PRESSURE      INLET
                         OR        RATED            RPM                FLOW      LB/SEC                  TEMP        RATIO       TEMP
                         SHP       T.O.         N1          N2         LB/HR                          DEGREES F      EPR      DEGREES F

  -0.00      1/ 0        1.00        0    27150.00      -0.00         75.00      2.52    0.009000      -0.00       -0.00        -0.00
  -0.00      2/ 1        3.10        0    41000.00      -0.00        137.00      6.06    0.006800      -0.00       -0.00        -0.00
  -0.00      6/ 2      171.40       29    41730.00      -0.00        201.00      6.12    0.009800      -0.00       -0.00        -0.00
  -0.00     11/ 6      361.80       61    41730.00      -0.00        265.00      6.08    0.013000      -0.00       -0.00        -0.00
  -0.00     16/11      476.00       80    41730.00      -0.00        307.00      6.04    0.015100      -0.00       -0.00        -0.00
  -0.00     20/16      596.60      101    41730.00      -0.00        362.00      5.96    0.018100      -0.00       -0.00        -0.00


  POWER     EXHAUST       EXHAUST          CO          CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT      GAS           GAS           (WET)         2       (WET)     (WET)       2         X
  RATED       TEMP        PRESSURE        PPMV        (WET)      PPMV      PPMV     (WET)     (WET)
  T.O.     DEGREES F        PSIA                    PERCENT V                       PPMV      PPMV

    0       735.00         -0.00         387.30       1.74     549.30      3.10      7.90     11.00     -0.00      -0.00      -0.00
    0       575.00         -0.00         247.30       1.44     138.10      6.10     13.80     19.90     -0.00      -0.00      -0.00
   29       700.00         -0.00         135.70       2.06      36.80     19.10     13.10     32.20     -0.00      -0.00      -0.00
   61       930.00         -0.00          81.90       2.59      11.20     32.70      9.10     41.90     -0.00      -0.00      -0.00
   80       935.00         -0.00          41.60       3.02       8.70     47.80      6.30     54.20     -0.00      -0.00      -0.00
  101      1050.00         -0.00          16.40       3.45       5.90     62.00      4.50     66.50     -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2        NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    0       42.46     34.44      1.42   2992.86      0.56      1.98      3.18      2.58      0.11    224.46      0.04      0.15
    0       33.59     10.74      3.08   3071.05      1.36      4.44      4.60      1.47      0.42    420.84      0.19      0.61
   29       13.11      2.06      2.09   3127.87      3.03      5.11      2.64      0.41      0.42    628.70      0.61      1.03
   61        6.32      0.50      1.15   3142.77      4.15      5.32      1.68      0.13      0.31    832.83      1.10      1.41
   80        2.76      0.33      0.69   3148.82      5.21      5.91      0.85      0.10      0.21    966.69      1.60      1.81
  101        0.95      0.20      0.43   3152.03      5.92      6.35      0.35      0.07      0.16   1141.03      2.14      2.30


  POWER          CO                 CO                 THC                NO                 NO                 NO
 PERCENT                             2                                                        2                  X
  RATED     LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR        LB/1K HP-HR
  T.O.

    0         3196.785         224954.750          2582.444            41.806            106.539            148.345
    0         1483.825         135756.000           474.567            60.119            136.006            196.124
   29           15.378           3668.043             2.386             3.555              2.438              5.994
   61            4.633           2301.919             0.363             3.038              0.845              3.893
   80            1.780           2330.856             0.213             3.360              0.443              3.810
  101            0.579           1912.562             0.119             3.593              0.261              3.854
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     CAL ID NUMBER:   31   ENGINE TYPE AND MODEL: TPE 331-151 G          SERIAL NUMBER:   P-91165

TEST ORGANIZATION:  AIRESEARCH


   MODE   FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     CO         FUEL   LB CO /     ENERGY   LB CO /
            POWER        HP       RATE      RATE    WT FACTOR   MODE      MASS        MASS  1K LB FUEL   HP-HR     HP-HR
                                  LB/HR     LB/HR               MIN.      LBS.        LBS.

TAXI-IDLE   0.060       35.4     3.214    127.414    1.000     19.00     1.018       40.35    25.225     11.21    0.09079
TAKEOFF     1.000      590.0     0.398    355.748    1.000      0.50     0.003        2.96     1.118      4.92    0.00067
CLIMBOUT    0.900      531.0     0.581    328.656    1.000      2.50     0.024       13.69     1.768     22.12    0.00109
APPROACH    0.300      177.0     2.560    197.618    1.000      4.50     0.192       14.82    12.956     13.27    0.01446
TAXI-IDLE   0.060       35.4     3.214    127.414    1.000      7.00     0.375       14.86    25.225      4.13    0.09079

                               TOTAL FOR CYCLE:                          1.612       86.69               55.66
                               LBS POLLUTANT/1K LB FUEL/CYCLE:          18.598
                               LBS POLLUTANT/1K HP-HR/CYCLE:            28.969
                               LBS POLLUTANT/1000K HP AT T.O.:           0.562


   MODE   FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     HC         FUEL   LB HC /     ENERGY   LB HC /
            POWER        HP       RATE      RATE    WT FACTOR   MODE      MASS        MASS  1K LB FUEL   HP-HR     HP-HR
                                  LB/HR     LB/HR               MIN.      LBS.        LBS.

TAXI-IDLE   0.060       35.4     0.764    127.414    1.000     19.00     0.242       40.35     5.999     11.21    0.02159
TAKEOFF     1.000      590.0     0.122    355.748    1.000      0.50     0.001        2.96     0.344      4.92    0.00021
CLIMBOUT    0.900      531.0     0.118    328.656    1.000      2.50     0.005       13.69     0.360     22.12    0.00022
APPROACH    0.300      177.0     0.352    197.618    1.000      4.50     0.026       14.82     1.781     13.27    0.00199
TAXI-IDLE   0.060       35.4     0.764    127.414    1.000      7.00     0.089       14.86     5.999      4.13    0.02159

                               TOTAL FOR CYCLE:                          0.364       86.69               55.66
                               LBS POLLUTANT/1K LB FUEL/CYCLE:           4.194
                               LBS POLLUTANT/1K HP-HR/CYCLE:             6.532
                               LBS POLLUTANT/1000K HP AT T.O.:           1.730


   MODE   FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN    NOX         FUEL   LB NOX/     ENERGY   LB NOX/
            POWER        HP       RATE      RATE    WT FACTOR   MODE      MASS        MASS  1K LB FUEL   HP-HR     HP-HR
                                  LB/HR     LB/HR               MIN.      LBS.        LBS.

TAXI-IDLE   0.060       35.4     0.606    127.414    1.000     19.00     0.192       40.35     4.757     11.21    0.01712
TAKEOFF     1.000      590.0     2.245    355.748    1.000      0.50     0.019        2.96     6.310      4.92    0.00380
CLIMBOUT    0.900      531.0     2.012    328.656    1.000      2.50     0.084       13.69     6.121     22.12    0.00379
APPROACH    0.300      177.0     1.009    197.618    1.000      4.50     0.076       14.82     5.103     13.27    0.00570
TAXI-IDLE   0.060       35.4     0.606    127.414    1.000      7.00     0.071       14.86     4.757      4.13    0.01712

                               TOTAL FOR CYCLE:                          0.441       86.69               55.66
                               LBS POLLUTANT/1K LB FUEL/CYCLE:           5.085
                               LBS POLLUTANT/1K HP-HR/CYCLE:             7.920
                               LBS POLLUTANT/1000K HP AT T.O.:          31.704
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DATE: 4/30/71

TEST ORGANIZATION: AIRESEARCH

ENGINE SUPPLIER: AIRESEARCH

ENGINE DATA **

CAL ID NUMBER: 32 ENGINE TYPE AND MODEL: TPE 331-151 G SERIAL NUMBER: P91168

RATED HORSEPOWER: 590.

ENGINE TOTAL TIME: 0. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 0. HRS
N2 COMPRESSOR OVERHAUL: 0. HRS
COMBUSTOR CAN REPLACEMENT: 0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 0. HRS
N1 TURBINE OVERHAUL: 0. HRS
N2 TURBINE OVERHAUL: 0. HRS

FUEL: JP-5 FUEL H/C RATIO: 1.928

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 89.00 FINISH 89.00

ATMOSPHERIC PRESSURE: START 28.75 FINISH 28.75

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0028

RELATIVE HUMIDITY: 11.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: -0.00, FLOW RATE, LITERS/MIN: -0.00

SAMPLE LINE TRANSPORT TIME, SEC: -0.00

NUMBER OF TESTS: 6

COMMENTS:

CONCENTRATION DATA REPORTED WET

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
-0.00	1/ 0	4.10	0	27200.00	-0.00	77.00	2.56	0.008900	-0.00	-0.00	-0.00
-0.00	2/ 1	9.50	1	41730.00	-0.00	150.00	6.21	0.007200	-0.00	-0.00	-0.00
-0.00	6/ 2	158.70	26	41730.00	-0.00	198.00	6.15	0.009500	-0.00	-0.00	-0.00
-0.00	11/ 6	317.30	53	41730.00	-0.00	255.00	6.09	0.012500	-0.00	-0.00	-0.00
-0.00	16/11	476.00	80	41730.00	-0.00	317.00	6.00	0.015700	-0.00	-0.00	-0.00
-0.00	20/16	596.60	101	41730.00	-0.00	369.00	5.94	0.018500	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO2 (WET) PPMV	NOx (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
0	698.00	-0.00	380.40	1.62	1037.40	4.40	12.20	16.60	-0.00	-0.00	-0.00
1	590.00	-0.00	162.00	1.44	53.60	14.90	20.80	35.70	-0.00	-0.00	-0.00
26	700.00	-0.00	140.50	1.87	26.20	30.90	21.10	52.00	-0.00	-0.00	-0.00
53	825.00	-0.00	103.00	2.37	6.10	49.90	21.00	70.90	-0.00	-0.00	-0.00
80	960.00	-0.00	50.00	3.14	3.00	88.30	10.80	99.10	-0.00	-0.00	-0.00
101	1080.00	-0.00	34.80	3.64	1.30	111.80	7.40	119.20	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
0	43.39	67.70	2.28	2900.17	0.83	3.11	3.34	5.21	0.18	223.31	0.06	0.24
1	22.35	4.22	4.69	3107.54	3.36	8.05	3.34	0.63	0.70	465.13	0.50	1.21
26	14.35	1.60	3.69	3126.20	5.40	9.09	2.96	0.32	0.73	618.99	1.07	1.80
53	8.68	0.29	2.91	3139.61	6.91	9.82	2.21	0.08	0.74	800.60	1.76	2.50
80	3.19	0.11	1.13	3148.75	9.25	10.39	1.01	0.03	0.36	998.15	2.93	3.29
101	1.92	0.04	0.67	3150.94	10.12	10.79	0.71	0.02	0.25	1162.70	3.73	3.98

POWER PERCENT RATED T.O.	CO LB/1K HP-HR	CO2 LB/1K HP-HR	THC LB/1K HP-HR	NO LB/1K HP-HR	NO2 LB/1K HP-HR	NOx LB/1K HP-HR
0	814.444	54466.580	1271.363	15.465	42.880	58.345
1	351.316	49066.422	66.572	53.075	74.091	127.166
26	18.551	3900.358	1.992	6.739	4.601	11.339
53	6.979	2523.169	0.287	5.55[illegible]	2.337	7.891
80	2.125	2096.962	0.073	6.165	0.754	6.919
101	1.136	1948.472	0.025	6.258	0.414	6.672

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    CAL ID NUMBER:   32   ENGINE TYPE AND MODEL: TPE 331-151 G          SERIAL NUMBER:   P91168

TEST ORGANIZATION:  AIRESEARCH

  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE      TIME IN      CO         FUEL     LB CO /      ENERGY    LB CO /
             POWER        HP       RATE       RATE    WT FACTOR     MODE       MASS        MASS   1K LB FUEL     HP-HR      HP-HR
                                  LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE   0.060        35.4     3.116     159.235     1.000      19.00      0.987       50.42     19.566       11.21    0.08801
TAKEOFF     1.000       590.0     0.700     366.064     1.000       0.50      0.006        3.05      1.911        4.92    0.00119
CLIMBOUT    0.900       531.0     0.874     339.250     1.000       2.50      0.036       14.14      2.576       22.12    0.00165
APPROACH    0.300       177.0     3.035     210.146     1.000       4.50      0.228       15.76     14.442       13.27    0.01715
TAXI-IDLE   0.060        35.4     3.116     159.235     1.000       7.00      0.363       18.58     19.566        4.13    0.08801

                                  TOTAL FOR CYCLE:                            1.620      101.95                  55.66
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            15.890
                                  LBS POLLUTANT/1K HP-HR/CYCLE:              29.107
                                  LBS POLLUTANT/1000K HP AT T.O.:             0.988


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE      TIME IN      HC         FUEL     LB HC /      ENERGY    LB HC /
             POWER        HP       RATE       RATE    WT FACTOR     MODE       MASS        MASS   1K LB FUEL     HP-HR      HP-HR
                                  LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE   0.060        35.4     0.367     159.235     1.000      19.00      0.116       50.42      2.302       11.21    0.01036
TAKEOFF     1.000       590.0     0.0       366.064     1.000       0.50      0.0          3.05      0.0          4.92    0.0
CLIMBOUT    0.900       531.0     0.0       339.250     1.000       2.50      0.0         14.14      0.0         22.12    0.C
APPROACH    0.300       177.0     0.262     210.146     1.000       4.50      0.020       15.76      1.249       13.27    0.00148
TAXI-IDLE   0.060        35.4     0.367     159.235     1.000       7.00      0.043       18.58      2.302        4.13    0.01036

                                  TOTAL FOR CYCLE:                            0.179      101.95                  55.66
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:             1.751
                                  LBS POLLUTANT/1K HP-HR/CYCLE:               3.208
                                  LBS POLLUTANT/1000K HP AT T.O.:             0.0


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE      TIME IN     NOX         FUEL     LB NOX/      ENERGY    LB NOX/
             POWER        HP       RATE       RATE    WT FACTOR     MODE       MASS        MASS   1K LB FUEL     HP-HR      HP-HR
                                  LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE   0.060        35.4     1.325     159.235     1.000      19.00      0.420       50.42      8.322       11.21    0.03743
TAKEOFF     1.000       590.0     3.922     366.064     1.000       0.50      0.033        3.05     10.715        4.92    0.00665
CLIMBOUT    0.900       531.0     3.580     339.250     1.000       2.50      0.149       14.14     10.552       22.12    0.00674
APPROACH    0.300       177.0     1.932     210.146     1.000       4.50      0.145       15.76      9.193       13.27    0.01091
TAXI-IDLF   0.060        35.4     1.325     159.235     1.000       7.00      0.155       18.58      8.322        4.13    0.03743

                                  TOTAL FOR CYCLE:                            0.901      101.95                  55.66
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:             8.837
                                  LBS POLLUTANT/1K HP-HR/CYCLE:              16.188
                                  LBS POLLUTANT/1000K HP AT T.O.:            55.399
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DATE:   6/18/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:   10    ENGINE TYPE AND MODEL:  TSE 231-1                     SERIAL NUMBER:    2301-10

                            RATED HORSEPOWER:       474.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: JP-5                 FUEL H/C RATIO:   1.877
OPERATIONAL DATA ******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START  110.00   FINISH  110.00

     ATMOSPHERIC PRESSURE:              START   28.60   FINISH   28.60

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0059

     RELATIVE HUMIDITY:                     14.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   6

COMMENTS:


                                                                                                                COMPRESSOR    ENGINE     TURBINE
                                    POWER                  ENGINE             MEASURED   GAS GEN     CALC       DISCHARGE    PRESSURE     INLET
  CLOCK      TEST           THRUST.LBS  PERCENT            SPEED                FUEL     AIR FLOW     F/A          TEMP       RATIO        TEMP
  TIME       MODE               OR       RATED              RPM                 FLOW     LB/SEC                 DEGREES F      EPR      DEGREES F
                               SHP       T.O.        N1          N2           LB/HR

  -0.00      1/ 0              0.0          0    32001.06    33652.00          68.50      1.61    0.013000        -0.00       -0.00        -0.00
  -0.00      2/ 1              0.0          0    37746.00    44982.00          93.50      2.20    0.012900        -0.00       -0.00        -0.00
  -0.00      6/ 2             71.70        15    41936.00    45004.00         125.60      2.72    0.014100        -0.00       -0.00        -0.00
  -0.00     11/ 6            157.80        33    45065.00    45011.00         164.40      3.13    0.016000        -0.00       -0.00        -0.00
  -0.00     16/11            210.20        44    46517.00    44967.00         186.50      3.35    0.017000        -0.00       -0.00        -0.00
  -0.00     20/16            257.90        54    47423.00    44946.00         203.50      3.52    0.017700        -0.00       -0.00        -0.00


                                                                                  NO         NO     ALDEHYDES    SMOKE    PARTICULATES
  POWER      EXHAUST       EXHAUST           CO          CO        THC       NO          2          X
 PERCENT       GAS           GAS           (WET)          2       (WET)     (WET)      (WET)      (WET)
  RATED       TEMP        PRESSURE          PPMV       (WET)       PPMV      PPMV       PPMV       PPMV
  T.O.     DEGREES F        PSIA                     PERCENT V

    0        910.00        -0.00          345.00       2.46      99.00     16.80      14.40      31.20      -0.00       -0.00       -0.00
    0        935.00        -0.00          161.00       2.50      21.50     31.00      11.50      42.50      -0.00       -0.00       -0.00
   15        995.00        -0.00          104.10       2.79      11.80     55.10      10.70      65.90      -0.00       -0.00       -0.00
   33       1070.00        -0.00           75.70       3.05       7.80     83.00       8.80      91.80      -0.00       -0.00       -0.00
   44       1100.00        -0.00           62.70       3.25       8.10    103.00       8.70     111.70      -0.00       -0.00       -0.00
   54       1120.00        -0.00           61.40       3.59       7.60    122.70      12.60     135.30      -0.00       -0.00       -0.00


                                                                                                     MASS EMI  MASS EMI  MASS EMI  MASS EMI
  POWER     MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI   NO2       CO2        NO       NOX
 PERCENT       CO        HC        NO2       CO2       NO        NOX       CO        HC      LB/HR     LB/HR      LB/HR     LB/HR
  RATED      LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR
  T.O.      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    0        27.76      4.56      1.90    3109.60     2.22      4.12      1.90      0.31      0.13     213.01      0.15      0.28
    0        12.88      0.99      1.51    3142.79     4.07      5.59      1.20      0.09      0.14     293.85      0.38      0.52
   15         7.49      0.49      1.26    3152.63     6.51      7.78      0.94      0.06      0.16     395.97      0.82      0.98
   33         4.99      0.29      0.95    3157.09     8.98      9.93      0.82      0.05      0.16     519.02      1.48      1.63
   44         3.88      0.29      0.88    3158.85    10.47     11.35      0.72      0.05      0.16     589.12      1.95      2.12
   54         3.44      0.24      1.16    3155.66    11.29     12.45      0.70      0.05      0.24     642.99      2.30      2.53


                                                                                      NO                 NO
  POWER           CO               CO              THC               NO                2                  X
 PERCENT                            2
  RATED      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR
  T.O.

***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
   15         13.115         5522.538           0.851           11.402            2.214            13.637
   33          5.196         3299.132           0.307            9.357            0.992            10.349
   44          3.441         2802.687           0.255            9.286            0.784            10.070
   54          2.714         2493.176           0.192            8.908            0.915             9.823
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    CAL ID NUMBER:   30   ENGINE TYPE AND MODEL: TSE 231-1            SERIAL NUMBER:   2301-10

TEST ORGANIZATION:  AIRESEARCH

   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      CO         FUEL    LB CO /     ENERGY   LB CO /
             POWER        HP       RATE      RATE     WT FACTOR     MODE      MASS        MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR     LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE    0.060        28.4    0.486     49.676    1.000       19.00     0.154        15.73     9.788       9.01    0.01710
TAKEOFF      1.000       474.0    0.287    260.734    1.000        0.50     0.002         2.17     1.102       3.95    0.00061
CLIMBOUT     0.900       426.6    0.400    247.922    1.000        2.50     0.017        10.33     1.615      17.77    0.00094
APPROACH     0.300       142.2    0.853    161.178    1.000        4.50     0.064        12.09     5.292      10.66    0.00600
TAXI-IDLE    0.060        28.4    0.486     49.676    1.000        7.00     0.057         5.80     9.788       3.32    0.01710

                                 TOTAL FOR CYCLE:                           0.294        46.12                 44.71
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            6.370
                                 LBS POLLUTANT/1K HP-HR/CYCLE:              6.569
                                 LBS POLLUTANT/1000K HP AT T.O.:            0.505


   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      HC         FUEL    LB HC /     ENERGY   LB HC /
             POWER        HP       RATE      RATE     WT FACTOR     MODE      MASS        MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR     LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE    0.060        28.4    0.035     49.676    1.000       19.00     0.011        15.73     0.705       9.01    0.00123
TAKEOFF      1.000       474.0    0.020    260.734    1.000        0.50     0.000         2.17     0.078       3.95    0.00004
CLIMBOUT     0.900       426.6    0.029    247.922    1.000        2.50     0.001        10.33     0.116      17.77    0.00007
APPROACH     0.300       142.2    0.052    161.178    1.000        4.50     0.004        12.09     0.322      10.66    0.00036
TAXI-IDLE    0.060        28.4    0.035     49.676    1.000        7.00     0.004         5.80     0.705       3.32    0.00123

                                 TOTAL FOR CYCLE:                           0.020        46.12                 44.71
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            0.443
                                 LBS POLLUTANT/1K HP-HR/CYCLE:              0.457
                                 LBS POLLUTANT/1000K HP AT T.O.:            0.356


   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     NOX         FUEL    LB NOX/     ENERGY   LB NOX/
             POWER        HP       RATE      RATE     WT FACTOR     MODE      MASS        MASS   1K LB FUEL    HP-HR     HP-HR
                                  LB/HR     LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE    0.060        28.4    0.148     49.676    1.000       19.00     0.047        15.73     2.982       9.01    0.00521
TAKEOFF      1.000       474.0    4.514    260.734    1.000        0.50     0.038         2.17    17.314       3.95    0.00952
CLIMBOUT     0.900       426.6    4.027    247.922    1.000        2.50     0.168        10.33    16.242      17.77    0.00944
APPROACH     0.300       142.2    1.544    161.178    1.000        4.50     0.116        12.09     9.581      10.66    0.01086
TAXI-IDLE    0.060        28.4    0.148     49.676    1.000        7.00     0.017         5.80     2.982       3.32    0.00521

                                 TOTAL FOR CYCLE:                           0.385        46.12                 44.71
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            8.357
                                 LBS POLLUTANT/1K HP-HR/CYCLE:              8.619
                                 LBS POLLUTANT/1000K HP AT T.O.:           79.365
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DATE:    7/20/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  119    ENGINE TYPE AND MODEL:  CJ-805-3A                 SERIAL NUMBER:   GE-161-302

                          RATED THRUST:         11200.

     ENGINE TOTAL TIME:                                19618. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          0. HRS
          N2 COMPRESSOR OVERHAUL:                         -0. HRS
          COMBUSTOR CAN REPLACEMENT:                       0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
          N1 TURBINE OVERHAUL:                             0. HRS
          N2 TURBINE OVERHAUL:                            -0. HRS

     FUEL: JP-4 TF               FUEL H/C RATIO:   2.020

OPERATIONAL DATA ***********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   74.00   FINISH   75.00

     ATMOSPHERIC PRESSURE:              START   29.04   FINISH   29.04

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0111

     RELATIVE HUMIDITY:                     56.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   4

COMMENTS:

 F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR LAST RUN.  NO2
 DETERMINED BY SUBTRACTION.


ELAPSED    TEST          POWER              ENGINE            MEASURED    GAS GEN      CALC      COMPRESSOR     ENGINE       TURBINE
 TIME      MODE    THRUST,LBS  PERCENT       SPEED              FUEL      AIR FLOW      F/A      DISCHARGE     PRESSURE       INLET
                       OR       RATED         RPM               FLOW       LB/SEC                   TEMP         RATIO         TEMP
                      SHP       T.O.     N1         N2          LB/HR                            DEGREES F        EPR       DEGREES F

  0.0      1/ 0     7720.00       68   7080.00    7080.00     6390.00     145.00    0.012200      -0.00         2.10         -0.00
  5.00     2/ 1     8620.00       76   7180.00    7180.00     7220.00     152.80    0.013100      -0.00         2.24         -0.00
 10.00     3/ 2     9620.00       85   7280.00    7280.00     8140.00     156.50    0.014500      -0.00         2.41         -0.00
 13.00     4/ 3      400.00        3   4490.00    4490.00     1090.00      36.00    0.008400      -0.00        -0.00         -0.00


 POWER     EXHAUST       EXHAUST          CO         CO        THC       NO         NO         NO      ALDEHYDES   SMOKE   PARTICULATES
PERCENT      GAS           GAS          (WET)         2       (WET)     (WET)        2          X
 RATED      TEMP        PRESSURE         PPMV      (WET)       PPMV      PPMV      (WET)      (WET)
 T.O.     DEGREES F       PSIA                   PERCENT V                          PPMV       PPMV

  68       957.00        15.60          57.00      2.51       2.00     53.00      6.00      59.00      -0.00      -0.00      -0.00
  76      1024.00        17.70          48.00      2.70       0.0      62.00      7.00      69.00      -0.00      -0.00      -0.00
  85      1100.00        20.10          45.00      2.89       0.0      74.00      8.00      82.00      -0.00      -0.00      -0.00
   3       727.00         0.40         464.00      1.63     302.00      1.00      8.00       9.00      -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  68        4.52      0.09      0.78   3125.69      6.90      7.68     28.37      0.58      4.99   19974.46     44.09     49.08
  76        3.54      0.0       0.85   3127.68      7.51      8.36     25.55      0.0       6.12   22581.85     54.21     60.33
  85        3.10      0.0       0.91   3128.37      8.37      9.28     25.24      0.0       7.37   25464.93     68.16     75.53
   3       54.22     20.21      1.54   2992.61      0.19      1.73     59.10     22.03      1.67    3261.94      0.21      1.88


 POWER          CO                CO               THC                NO                NO                NO
PERCENT                            2                                                     2                 X
 RATED    LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

  68          3.740          2597.365            0.075             5.711             0.647             6.358
  76          2.964          2619.704            0.0               6.289             0.710             6.999
  85          2.623          2647.082            0.0               7.086             0.766             7.852
   3        147.744          8154.855           55.073             0.523             4.184             4.707
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    CAL ID NUMBER:  119   ENGINE TYPE AND-MODEL: CJ-805-3A             SERIAL NUMBER:  GE-161-302

TEST ORGANIZATION:  S W R I TWA


  MODE     FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO          FUEL      LB CO /     ENERGY    LB CO /
            POWER        # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.040        448.0    48.149     880.962     1.000      19.00     15.247      278.97     54.655     141.87     0.10748
TAKEOFF     1.000      11200.0    26.189    9801.957     1.000       0.70      0.306      114.36      2.672     130.67     0.00234
CLIMBOUT    0.850       9520.0    25.857    8323.387     1.000       2.20      0.948      305.19      3.107     349.07     0.00272
APPROACH    0.400       4480.0    40.743    3798.427     1.000       4.00      2.716      253.23     10.726     298.67     0.00909
TAXI-IDLE   0.040        448.0    48.149     880.962     1.000       7.00      5.617      102.78     54.655      52.27     0.10748

                                   TOTAL FOR CYCLE:                          24.835     1054.52                972.53
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:           23.550
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:          25.536
                                   LBS POLLUTANT/1000K LB TH AT T.O.:         2.728


  MODE     FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC          FUEL      LB HC /     ENERGY    LB HC /
            POWER        # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.040        448.0    17.791     880.962     1.000      19.00      5.634      278.97     20.195     141.87     0.03971
TAKEOFF     1.000      11200.0     0.503    9801.957     1.000       0.70      0.006      114.36      0.051     130.67     0.00004
CLIMBOUT    0.850       9520.0     1.243    8323.387     1.000       2.20      0.046      305.19      0.149     349.07     0.00013
APPROACH    0.400       4480.0     1.688    3798.427     1.000       4.00      0.113      253.23      0.444     298.67     0.00038
TAXI-IDLE   0.040        448.0    17.791     880.962     1.000       7.00      2.076      102.78     20.195      52.27     0.03971

                                   TOTAL FOR CYCLE:                           7.873     1054.52                972.53
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:            7.466
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:           8.096
                                   LBS POLLUTANT/1000K LB TH AT T.O.:         0.524


  MODE     FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX          FUEL      LB NOX/     ENERGY    LB NOX/
            POWER        # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.040        448.0     1.521     880.962     1.000      19.00      0.482      278.97      1.726     141.87     0.00339
TAKEOFF     1.000      11200.0   104.398    9801.957     1.000       0.70      1.218      114.36     10.651     130.67     0.00932
CLIMBOUT    0.850       9520.0    79.004    8323.387     1.000       2.20      2.897      305.19      9.492     349.07     0.00830
APPROACH    0.400       4480.0    18.462    3798.427     1.000       4.00      1.231      253.23      4.860     298.67     0.00412
TAXI-IDLE   0.040        448.0     1.521     880.962     1.000       7.00      0.177      102.78      1.726      52.27     0.00339

                                   TOTAL FOR CYCLE:                           6.004     1054.52                972.53
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:            5.694
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:           6.174
                                   LBS POLLUTANT/1000K LB TH AT T.O.:       108.748
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DATE: 7/20/71

TEST ORGANIZATION: S W R I TWA

ENGINE SUPPLIER: T W A

ENGINE DATA **

CAL ID NUMBER: 120 ENGINE TYPE AND MODEL: CJ-805-3A SERIAL NUMBER: GF-161-302

RATED THRUST: 11200.

ENGINE TOTAL TIME: 19618. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	0. HRS
N2 COMPRESSOR OVERHAUL:	-0. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	0. HRS
N1 TURBINE OVERHAUL:	0. HRS
N2 TURBINE OVERHAUL:	-0. HRS

FUEL: JP-4 TF FUEL H/C RATIO: 2.020

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 76.00 FINISH 80.00

ATMOSPHERIC PRESSURE: START 29.03 FINISH 29.02

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0121

RELATIVE HUMIDITY: 51.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 0.60

NUMBER OF TESTS: 4

COMMENTS:

F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN. NO2 DETERMINED BY SUBTRACTION.

ELAPSED TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	1/ 0	7720.00	68	7100.00	7100.00	6390.00	144.90	0.012200	-0.00	-0.00	-0.00
5.00	2/ 1	8560.00	77	7210.00	7210.00	7480.00	153.00	0.013600	-0.00	-0.00	-0.00
8.50	3/ 2	9800.00	87	7650.00	7650.00	8370.00	160.10	0.014500	-0.00	-0.00	-0.00
13.00	4/ 3	380.00	3	4490.00	4490.00	1080.00	38.00	0.007900	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT	THC (WET) PPMV	NO (WET) PPMV	NO 2 (WET) PPMV	NO X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
68	959.00	15.50	52.00	[illegible]	4.00	52.00	5.00	57.00	-0.00	-0.00	-0.00
77	1045.00	17.70	43.00	2.[illegible]	0.0	64.00	7.00	71.00	-0.00	-0.00	-0.00
87	1126.00	20.20	43.00	2.91	0.0	81.00	6.00	87.00	-0.00	-0.00	-0.00
3	734.00	0.40	397.00	1.52	353.00	1.00	7.00	8.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
68	4.42	0.19	0.70	3125.76	7.26	7.96	28.25	1.24	4.46	19973.61	46.40	50.86
77	3.27	0.0	0.87	3128.11	7.99	8.86	24.44	0.0	6.54	23398.23	59.75	66.29
87	2.94	0.0	0.67	3128.62	9.10	9.78	24.63	0.0	5.64	26186.54	76.20	81.84
3	49.63	25.28	1.44	2985.91	0.21	1.64	53.61	27.30	1.55	3224.78	0.22	1.77

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO 2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO 2 LB/1K#TH-HR	NO X LB/1K#TH-HR
68	3.659	2597.255	0.161	6.010	0.578	6.588
77	2.822	2701.875	0.0	6.903	0.755	7.654
87	2.513	2672.096	0.0	7.775	0.576	8.351
3	141.367	9496.270	71.838	0.584	4.086	4.669

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    CAL ID NUMBER:  120   ENGINE TYPE AND MODEL: CJ-805-3A            SERIAL NUMBER:  GE-161-302

TEST ORGANIZATION:  S W R I TWA


  MODE    FRACTIONAL    POWER   EMISSION     FUEL      USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY   LB CO /
            POWER       # TH      RATE       RATE    WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR      LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.040       448.0   46.922    942.369     1.000       19.00    14.859     298.42     49.792    141.87    0.10474
TAKEOFF     1.000     11200.0   28.201  10254.902     1.000        0.70     0.329     119.64      2.750    130.67    0.00252
CLIMBOUT    0.850      9520.0   25.301   8579.902     1.000        2.20     0.928     314.60      2.949    349.07    0.00266
APPROACH    0.400      4480.0   34.332   3437.208     1.000        4.00     2.289     229.15      9.988    298.67    0.00766
TAXI-IDLE   0.040       448.0   46.922    942.369     1.000        7.00     5.474     109.94     49.792     52.27    0.10474

                                TOTAL FOR CYCLE:                           23.878    1071.74               972.53
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            22.280
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           24.553
                                LBS POLLUTANT/1000K LB TH AT T.O.:          2.938


  MODE    FRACTIONAL    POWER   EMISSION     FUEL      USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY   LB HC /
            POWER       # TH      RATE       RATE    WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR      LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.040       448.0   23.402    942.369     1.000       19.00     7.411     298.42     24.833    141.87    0.05224
TAKEOFF     1.000     11200.0    0.012  10254.902     1.000        0.70     0.000     119.64      0.001    130.67    0.00000
CLIMBOUT    0.850      9520.0    0.389   8579.902     1.000        2.20     0.014     314.60      0.045    349.07    0.00004
APPROACH    0.400      4480.0    4.175   3437.208     1.000        4.00     0.278     229.15      1.215    298.67    0.00093
TAXI-IDLE   0.040       448.0   23.402    942.369     1.000        7.00     2.730     109.94     24.833     52.27    0.05224

                                TOTAL FOR CYCLE:                           10.433    1071.74               972.53
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             9.735
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           10.728
                                LBS POLLUTANT/1000K LB TH AT T.O.:          0.013


  MODE    FRACTIONAL    POWER   EMISSION     FUEL      USAGE     TIME IN      NOX       FUEL     LB NOX/     ENERGY   LB NOX/
            POWER       # TH      RATE       RATE    WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR      LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.040       448.0    1.570    942.369     1.000       19.00     0.497     298.42      1.666    141.87    0.00350
TAKEOFF     1.000     11200.0  115.527  10254.902     1.000        0.70     1.348     119.64     11.265    130.67    0.01031
CLIMBOUT    0.850      9520.0   84.564   8579.902     1.000        2.20     3.101     314.60      9.856    349.07    0.00888
APPROACH    0.400      4480.0   17.023   3437.208     1.000        4.00     1.135     229.15      4.953    298.67    0.00380
TAXI-IDLE   0.040       448.0    1.570    942.369     1.000        7.00     0.183     109.94      1.666     52.27    0.00350

                                TOTAL FOR CYCLE:                            6.264    1071.74               972.53
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             5.844
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:            6.441
                                LBS POLLUTANT/1000K LB TH AT T.O.:        120.340
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DATE:   7/26/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  281    ENGINE TYPE AND MODEL:  CJ-805-3A                    SERIAL NUMBER:   GE-161-156

                         RATED THRUST:        11200.

      ENGINE TOTAL TIME:                                  0. HRS

      TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

      TIME SINCE:

           N1 COMPRESSOR OVERHAUL:                        0. HRS
           N2 COMPRESSOR OVERHAUL:                        0. HRS
           COMBUSTOR CAN REPLACEMENT:                     0. HRS
           FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
           N1 TURBINE OVERHAUL:                           0. HRS
           N2 TURBINE OVERHAUL:                           0. HRS

      FUEL: JP-4 TF               FUEL H/C RATIO:   2.020

  OPERATIONAL DATA ************************************************************

       INLET AIR TEMPERATURE, DEGREES F:  START   64.00   FINISH   65.00

       ATMOSPHERIC PRESSURE:              START   29.01   FINISH   29.01

       INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0099

       RELATIVE HUMIDITY:                   73.00  PERCENT

       SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    42.50

       SAMPLE LINE TRANSPORT TIME, SEC:    1.00

  NUMBER OF TESTS:   4

  COMMENTS:

   F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION ON 4TH RUN.  NO2
   DETERMINED BY SUBTRACTION.


 ELAPSED     TEST          POWER                  ENGINE           MEASURED    GAS GEN     CALC     COMPRESSOR     ENGINE      TURBINE
  TIME       MODE     THRUST,LBS  PERCENT         SPEED              FUEL     AIR FLOW     F/A      DISCHARGE     PRESSURE      INLET
                          OR       RATED           RPM               FLOW      LB/SEC                 TEMP          RATIO        TEMP
                         SHP       T.O.      N1          N2          LB/HR                          DEGREES F        EPR      DEGREES F

   0.0       1/ 0     8360.00       74    7090.00     7090.00     6790.00     153.60    0.012300      -0.00          2.20        -0.00
   9.00      2/ 1     9100.00       81    7180.00     7180.00     7480.00     156.80    0.013200      -0.00          2.28        -0.00
  16.00      3/ 2    10120.00       90    7370.00     7370.00     8620.00     163.00    0.014700      -0.00          2.47        -0.00
  20.00      4/ 3      400.00        3    4530.00     4530.00     1060.00      32.40    0.009100      -0.00         -0.00        -0.00


  POWER     EXHAUST      EXHAUST          CO          CO         THC        NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
 PERCENT      GAS          GAS          (WET)          2        (WET)     (WET)         2           X
  RATED      TEMP       PRESSURE         PPMV       (WET)       PPMV      PPMV       (WET)       (WET)
  T.O.     DEGREES F      PSIA                    PERCENT V                          PPMV        PPMV

   74       968.00       17.00          60.00        2.58       0.0       51.00      2.00        53.00     -0.00       -0.00        -0.00
   81      1031.00       18.70          51.00        2.63       0.0       55.00      2.00        57.00     -0.00       -0.00        -0.00
   90      1130.00       21.00          48.00        2.90       0.0       81.00      3.00        84.00     -0.00       -0.00        -0.00
    3       716.00        0.50         573.00        1.77     325.00       3.00      8.00        11.00     -0.00       -0.00        -0.00


  POWER     MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED      LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   74         4.63      0.0       0.25   3125.97      6.46      6.71     31.42      0.0       1.72  21225.34     43.86     45.58
   81         3.36      0.0       0.25   3127.18      6.84      7.09     28.87      0.0       1.86  23391.28     51.14     53.00
   90         3.30      0.0       0.34   3128.06      9.13      9.47     28.40      0.0       2.92  26963.91     79.73     81.65
    3        61.44     19.96      1.41   2981.95      0.53      1.94     65.13     21.16      1.49   3160.87      0.56      2.05


  POWER           CO                CO              THC               NO               NO              NO
 PERCENT                             2                                                   2               X
  RATED     LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

   74          3.758          2538.917          0.0               5.247            0.206            5.452
   81          3.172          2570.470          0.0               5.620            0.204            5.824
   90          2.807          2664.419          0.0               7.780            0.288            8.069
    3        162.913          7902.172         52.889             1.400            3.734            5.134
    CAL ID NUMBER:  281   ENGINE TYPE AND MODEL: CJ-805-3A            SERIAL NUMBER:  GE-161-156

TEST ORGANIZATION:  S W R I TWA


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO        FUEL      LB CO /     ENERGY   LB CO /
              POWER      # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.040        448.0    82.466   1115.998     1.000       19.00     26.114     353.40     73.894     141.87    0.18408
TAKEOFF     1.000      11200.0    24.354  10244.773     1.000        0.70      0.284     119.52      2.377     130.67    0.00217
CLIMBOUT    0.850       9520.0    29.243   8469.777     1.000        2.20      1.072     310.56      3.453     349.07    0.00307
APPROACH    0.400       4480.0    48.659   4237.141     1.000        4.00      3.244     282.48     11.484     298.67    0.01086
TAXI-IDLE   0.040        448.0    82.466   1115.998     1.000        7.00      9.621     130.20     73.894      52.27    0.18408

                                  TOTAL FOR CYCLE:                           40.336    1196.16                972.53
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            33.721
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           41.475
                                  LBS POLLUTANT/1000K LB TH AT T.O.:          2.537


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC        FUEL      LB HC /     ENERGY   LB HC /
              POWER      # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.040        448.0    21.500   1115.998     1.000       19.00      6.808     353.40     19.265     141.87    0.04799
TAKEOFF     1.000      11200.0     0.829  10244.773     1.000        0.70      0.010     119.52      0.081     130.67    0.00007
CLIMBOUT    0.850       9520.0     0.615   8469.777     1.000        2.20      0.023     310.56      0.073     349.07    0.00006
APPROACH    0.400       4480.0     0.418   4237.141     1.000        4.00      0.028     282.48      0.099     298.67    0.00009
TAXI-IDLE   0.040        448.0    21.500   1115.998     1.000        7.00      2.508     130.20     19.265      52.27    0.04799

                                  TOTAL FOR CYCLE:                            9.377    1196.16                972.53
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:             7.839
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:            9.641
                                  LBS POLLUTANT/1000K LB TH AT T.O.:          0.863


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL      LB NOX/     ENERGY   LB NOX/
              POWER      # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.040        448.0     2.042   1115.998     1.000       19.00      0.647     353.40      1.830     141.87    0.00456
TAKEOFF     1.000      11200.0   150.025  10244.773     1.000        0.70      1.750     119.52     14.644     130.67    0.01340
CLIMBOUT    0.850       9520.0    73.870   8469.777     1.000        2.20      2.709     310.56      8.722     349.07    0.00776
APPROACH    0.400       4480.0    17.655   4237.141     1.000        4.00      1.177     282.48      4.167     298.67    0.00394
TAXI-IDLE   0.040        448.0     2.042   1115.998     1.000        7.00      0.238     130.20      1.830      52.27    0.00456

                                  TOTAL FOR CYCLE:                            6.521    1196.16                972.53
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:             5.452
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:            6.705
                                  LBS POLLUTANT/1000K LB TH AT T.O.:        156.276
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DATE:   8/ 4/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ****************************************************************************************************************

     CAL ID NUMBER:  309    ENGINE TYPE AND MODEL:  CJ-805-3A                SERIAL NUMBER:   GE161 108

                           RATED THRUST:         11200.

     ENGINE TOTAL TIME:                                22738. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          0. HRS
          N2 COMPRESSOR OVERHAUL:                         -0. HRS
          COMBUSTOR CAN REPLACEMENT:                       0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
          N1 TURBINE OVERHAUL:                             0. HRS
          N2 TURBINE OVERHAUL:                            -0. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA *********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   75.00   FINISH   75.00

     ATMOSPHERIC PRESSURE:              START   29.06   FINISH   29.00

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0153

     RELATIVE HUMIDITY:                        72.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:     1.00

NUMBER OF TESTS:   4

COMMENTS:

 F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
 DETERMINED BY SUBTRACTION.  THIS TEST IS THE FIRST OF FOUR RUN ON THIS ENGINE
  THE FUEL USED DURING THIS TEST CONTAINED NO CI-2.


ELAPSED    TEST           POWER               ENGINE              MEASURED    GAS GEN      CALC      COMPRESSOR     ENGINE       TURBINE
 TIME      MODE     THRUST,LBS  PERCENT        SPEED                FUEL     AIR FLOW      F/A      DISCHARGE     PRESSURE       INLET
                        OR       RATED          RPM                 FLOW      LB/SEC                   TEMP         RATIO         TEMP
                       SHP       T.O.      N1          N2          LB/HR                            DEGREES F        EPR       DEGREES F

   0.0     1/ 0     8080.00       72    7120.00     7120.00      6670.00     148.20     0.012500      -0.00         -0.00         -0.00
   4.00    2/ 1     8820.00       78    7180.00     7180.00      7300.00     152.30     0.013300      -0.00         -0.00         -0.00
  10.00    3/ 2    10000.00       89    7380.00     7380.00      8590.00     162.50     0.014700      -0.00         -0.00         -0.00
  15.00    4/ 3      400.00        3    4510.00     4510.00      1090.00      43.90     0.006900      -0.00         -0.00         -0.00


 POWER     EXHAUST      EXHAUST          CO          CO        THC        NO         NO         NO      ALDEHYDES    SMOKE    PARTICULATES
PERCENT      GAS          GAS          (WET)          2       (WET)      (WET)        2          X
 RATED      TEMP        PRESSURE        PPMV       (WET)       PPMV       PPMV      (WET)      (WET)
 T.O.    DEGREES F        PSIA                   PERCENT V                           PPMV       PPMV

  72        968.00       16.50         52.30       2.55       0.0       53.00       7.00      60.00      -0.00       -0.00       -0.00
  78       1022.00       17.90         48.00       2.70       0.0       61.00       5.00      66.00      -0.00       -0.00       -0.00
  89       1128.00       20.80         46.30       2.96       0.0       75.00       6.00      81.00      -0.00       -0.00       -0.00
   3        716.00        0.50        472.00       1.31     340.00       3.00       4.00       7.00      -0.00       -0.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  72        4.06      0.0       0.90   3126.87      6.79      7.69     27.07      0.0       5.99   20856.19     45.32     51.30
  78        3.54      0.0       0.61   3127.68      7.39      7.99     25.83      0.0       4.42   22832.06     53.93     58.35
  89        3.09      0.0       0.66   3128.38      8.29      8.95     26.58      0.0       5.69   26872.78     71.18     76.88
   3       67.66     27.91      0.94   2950.37      0.71      1.65     73.75     30.42      1.03    3215.90      0.77      1.80


 POWER          CO               CO                THC                NO               NO              NO
PERCENT                           2                                                     2               X
 RATED      LB/1K#TH-HR      LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR     LB/1K#TH-HR
 T.O.

  72           3.350         2581.211             0.0               5.608            0.741           6.349
  78           2.929         2588.669             0.0               6.114            0.501           6.615
  89           2.659         2687.278             0.0               7.118            0.569           7.688
   3         184.363         8039.742            76.060             1.925            2.566           4.491
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    CAL ID NUMBER:  309   ENGINE TYPE AND MODEL: CJ-805-3A              SERIAL NUMBER:  GE161 108

TEST ORGANIZATION:  S W R I TWA


  MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL     LB CO /     ENERGY    LB CO /
            POWER        # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.040        448.0    70.769    1085.125     1.000       19.00     22.410      343.62     65.217     141.87     0.15797
TAKEOFF     1.000      11200.0    25.349    9531.477     1.000        0.70      0.296      111.20      2.660     130.67     0.00226
CLIMBOUT    0.850       9520.0    26.794    7993.285     1.000        2.20      0.982      293.09      3.352     349.07     0.00281
APPROACH    0.400       4480.0    31.848    3959.430     1.000        4.00      2.123      263.96      8.044     298.67     0.00711
TAXI-IDLE   0.040        448.0    70.769    1085.125     1.000        7.00      8.256      126.60     65.217      52.27     0.15797

                                 TOTAL FOR CYCLE:                              34.068     1138.47                972.53
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               29.924
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              35.030
                                 LBS POLLUTANT/1000K LB TH AT T.O.:             2.641


  MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL     LB HC /     ENERGY    LB HC /
            POWER        # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.040        448.0    34.269    1085.125     1.000       19.00     10.852      343.62     31.581     141.87     0.07649
TAKEOFF     1.000      11200.0     0.535    9531.477     1.000        0.70      0.006      111.20      0.056     130.67     0.00005
CLIMBOUT    0.850       9520.0     0.603    7993.285     1.000        2.20      0.022      293.09      0.075     349.07     0.00006
APPROACH    0.400       4480.0     1.867    3959.430     1.000        4.00      0.124      263.96      0.471     298.67     0.00042
TAXI-IDLE   0.040        448.0    34.269    1085.125     1.000        7.00      3.998      126.60     31.581      52.27     0.07649

                                 TOTAL FOR CYCLE:                              15.003     1138.47                972.53
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               13.178
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              15.426
                                 LBS POLLUTANT/1000K LB TH AT T.O.:             0.557


  MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      NOX        FUEL     LB NOX/     ENERGY    LB NOX/
            POWER        # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.040        448.0     1.220    1085.125     1.000       19.00      0.386      343.62      1.125     141.87     0.00272
TAKEOFF     1.000      11200.0   100.352    9531.477     1.000        0.70      1.171      111.20     10.528     130.67     0.00896
CLIMBOUT    0.850       9520.0    70.458    7993.285     1.000        2.20      2.583      293.09      8.815     349.07     0.00740
APPROACH    0.400       4480.0    18.434    3959.430     1.000        4.00      1.229      263.96      4.656     298.67     0.00411
TAXI-IDLE   0.040        448.0     1.220    1085.125     1.000        7.00      0.142      126.60      1.125      52.27     0.00272

                                 TOTAL FOR CYCLE:                               5.512     1138.47                972.53
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:                4.842
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:               5.668
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           104.533
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DATE:   8/ 4/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA *******************************************************************************************************

     CAL ID NUMBER:  310    ENGINE TYPE AND MODEL:  CJ-805-3A                SERIAL NUMBER:   GE-161 108

                             RATED THRUST:          11200.

     ENGINE TOTAL TIME:                             22738. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       0. HRS
          N2 COMPRESSOR OVERHAUL:                      -0. HRS
          COMBUSTOR CAN REPLACEMENT:                    0. HRS
          FIRST STAGE NOZZLE GUIDE VANE CVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                          0. HRS
          N2 TURBINE OVERHAUL:                         -0. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA ****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   77.00   FINISH   77.00

     ATMOSPHERIC PRESSURE:              START   29.05   FINISH   29.05

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0150

     RELATIVE HUMIDITY:                 68.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.0C,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:   4

 COMMENTS:

  F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
  DETERMINED BY SUBTRACTION.  THIS TEST IS THE SECOND OF FOUR TESTS ON THE SAME
  ENGINE.  THE FUEL USED WAS TO CONTAIN THE NCRMAS CONCENTRATION OF CI-2, BUT TWA
  HAD PROBLEMS WITH THE CI-2 PUMP, SO THE ACTUAL CONCENTRATION IS NOT KNOWN.


 ELAPSED    TEST           POWER                  ENGINE           MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE      TURBINE
 TIME       MODE     THRUST,LBS  PERCENT          SPEED              FUEL      AIR FLOW      F/A     DISCHARGE     PRESSURE      INLET
                        OR        RATED            RPM               FLOW      LB/SEC                  TEMP         RATIO        TEMP
                       SHP        T.O.       N1          N2          LB/HR                          DEGREES F        EPR       DEGREES F

   0.0      1/ 0     8160.00       72     7130.00     7130.00     6680.00     147.50    0.012800      -0.00         -0.00         -0.00
   3.00     2/ 1     8820.00       78     7180.00     7180.00     7290.00     151.80    0.013300      -0.00         -0.00         -0.00
   6.00     3/ 2    10020.00       89     7380.00     7380.00     8620.00     162.10    0.014800      -0.00         -0.00         -0.00
  10.00     4/ 3      400.00        3     4520.00     4520.00     1090.00      44.50    0.006800      -0.00         -0.00         -0.00


 POWER    EXHAUST      EXHAUST          CO          CO         THC        NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
 PERCENT    GAS          GAS          (WET)          2        (WET)     (WET)         2           X
 RATED     TEMP       PRESSURE        PPMV        (WET)       PPMV      PPMV       (WET)       (WET)
 T.O.    DEGREES F      PSIA                    PERCENT V                          PPMV        PPMV

   72      982.00       16.70         68.00       2.61        0.0       55.00      3.00       58.00      -0.00       -0.00       -0.00
   78     1029.00       17.90         67.00       2.71        0.0       61.00      2.00       63.00      -0.00       -0.00       -0.00
   89     1137.00       20.90         60.00       2.97        0.0       75.00      5.00       80.00      -0.00       -0.00       -0.00
    3      736.00        0.50        454.00       1.30      337.00       3.00      5.00        8.00      -0.00       -0.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   72        5.18      0.0        0.38   3125.10      6.88      7.26     34.62      0.0        2.51  20875.65     45.99     48.50
   78        4.92      0.0        0.24   3125.51      7.35      7.60     35.85      0.0        1.76  22785.00     53.62     55.37
   89        4.02      0.0        0.55   3126.92      8.25      8.81     34.66      0.0        4.74  26954.08     71.16     75.90
    3       65.65     27.91       1.19   2953.53      0.71      1.90     71.56     30.42       1.29   3219.35      0.78      2.07


 POWER          CO                 CO                THC                NO                NO                NO
 PERCENT                            2                                                      2                 X
 RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

   72          4.242            2558.291             0.0               5.636             0.307             5.943
   78          4.065            2583.333             0.0               6.079             0.199             6.278
   89          3.459            2690.028             0.0               7.101             0.473             7.575
    3        178.388            8048.363            76.050             1.942             3.236             5.178
    CAL ID NUMBER:  310   ENGINE TYPE AND MODEL: CJ-805-3A           SERIAL NUMBER:  GE-161 108

TEST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      CO        FUEL     LB CO /      ENERGY    LB CO /
            POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.040       448.0    72.159   1130.329     1.000      19.00     22.850     357.94     63.839      141.87     0.16107
TAKEOFF     1.000     11200.0    30.102   9888.805     1.000       0.70      0.351     115.37      3.044      130.67     0.00269
CLIMBOUT    0.850      9520.0    32.194   8193.301     1.000       2.20      1.180     300.42      3.929      349.07     0.00338
APPROACH    0.400      4480.0    56.785   3968.873     1.000       4.00      3.786     264.59     14.308      298.67     0.01268
TAXI-IDLE   0.040       448.0    72.159   1130.329     1.000       7.00      8.419     131.87     63.839       52.27     0.16107

                                 TOTAL FOR CYCLE:                          36.586    1170.19                 972.53
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           31.265
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          37.620
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         3.136

  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      HC        FUEL     LB HC /      ENERGY    LB HC /
            POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.040       448.0    29.828   1130.329     1.000      19.00      9.446     357.94     26.389      141.87     0.06658
TAKEOFF     1.000     11200.0    0.0      9888.805     1.000       0.70      0.0       115.37      0.0        130.67     0.0
CLIMBOUT    0.850      9520.0    0.0      8193.301     1.000       2.20      0.0       300.42      0.0        349.07     0.0
APPROACH    0.400      4480.0     6.068   3968.873     1.000       4.00      0.405     264.59      1.529      298.67     0.00135
TAXI-IDLE   0.040       448.0    29.828   1130.329     1.000       7.00      3.480     131.87     26.389       52.27     0.06658

                                 TOTAL FOR CYCLE:                          13.330    1170.19                 972.53
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           11.391
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          13.707
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         0.0

  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/      ENERGY    LB NOX/
            POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.040       448.0     2.204   1130.329     1.000      19.00      0.698     357.94      1.950      141.87     0.00492
TAKEOFF     1.000     11200.0   100.271   9888.805     1.000       0.70      1.170     115.37     10.140      130.67     0.00895
CLIMBOUT    0.850      9520.0    68.281   8193.301     1.000       2.20      2.504     300.42      8.334      349.07     0.00717
APPROACH    0.400      4480.0    20.651   3968.873     1.000       4.00      1.377     264.59      5.203      298.67     0.00461
TAXI-IDLE   0.040       448.0     2.204   1130.329     1.000       7.00      0.257     131.87      1.950       52.27     0.00492

                                 TOTAL FOR CYCLE:                           6.005    1170.19                 972.53
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            5.132
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           6.175
                                 LBS POLLUTANT/1000K LB TH AT T.O.:       104.449
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DATE:   8/ 4/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ***********************************************************************************************************

     CAL ID NUMBER:  311    ENGINE TYPE AND MODEL:  CJ-805-3A                    SERIAL NUMBER:   GE-161-108

                            RATED THRUST:          11200.

     ENGINE TOTAL TIME:                              22738. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       0. HRS
          N2 COMPRESSOR OVERHAUL:                      -0. HRS
          COMBUSTOR CAN REPLACEMENT:                    0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                          0. HRS
          N2 TURBINE OVERHAUL:                         -0. HRS

     FUEL: JP-4 TF                 FUEL H/C RATIO:   2.020

OPERATIONAL DATA ******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   77.00   FINISH   78.00

     ATMOSPHERIC PRESSURE:              START   29.04   FINISH   29.04

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0154

     RELATIVE HUMIDITY:                     66.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   4

COMMENTS:

 F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
 DETERMINED BY SUBTRACTION.  THIS IS THE THIRD OF FOUR TESTS ON THIS ENGINE.
 THE CI-2 CONCENTRATION IN THE FUEL FOR THIS TEST WAS MINIMUM (0.0125% BY
 VOLUME).


 ELAPSED   TEST          POWER              ENGINE             MEASURED   GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
  TIME     MODE    THRUST,LBS  PERCENT        SPEED               FUEL     AIR FLOW      F/A     DISCHARGE    PRESSURE      INLET
                       OR       RATED          RPM                FLOW      LB/SEC                  TEMP        RATIO        TEMP
                      SHP       T.O.      N1          N2         LB/HR                           DEGREES F      EPR      DEGREES F

   0.0      1/ 0    8260.00      73     7150.00    7150.00     6780.00     149.20     0.012600     -0.00        -0.00        -0.00
   3.00     2/ 1    9800.00      78     7200.00    7200.00     7390.00     152.80     0.013400     -0.00        -0.00        -0.00
  60.00     3/ 2   10000.00      89     7410.00    7410.00     8620.00     162.60     0.014700     -0.00        -0.00        -0.00
  10.00     4/ 3     400.00       3     4510.00    4510.00     1080.00      43.40     0.006900     -0.00        -0.00        -0.00


 POWER    EXHAUST      EXHAUST        CO         CO        THC       NO        NO        NO      ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS          GAS         (WET)        2       (WET)     (WET)       2         X
 RATED     TEMP        PRESSURE      PPMV      (WET)      PPMV      PPMV      (WET)     (WET)
 T.O.    DEGREES F       PSIA               PERCENT V                         PPMV      PPMV

  73      999.00        16.90        56.00      2.56       0.0      56.00     5.00     61.00     -0.00      -0.00      -0.00
  78     1040.00        18.00        54.00      2.75       0.0      61.00     5.00     66.00     -0.00      -0.00      -0.00
  89     1146.00        20.90        53.00      3.00       0.0      75.00     6.00     91.00     -0.00      -0.00      -0.00
   3      725.00         0.50       471.00      1.43     345.00      3.00     4.00      7.00     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  73        4.35      0.0       0.64    3126.40     7.15      7.79     29.51      0.0       4.33   21197.00     48.47     52.80
  78        3.91      0.0       0.59    3127.10     7.25      7.65     28.88      0.0       4.39   23109.26     53.59     57.98
  89        3.52      0.0       0.65    3127.71     8.17      9.92     30.31      0.0       5.64   26960.90     70.46     85.49
   3       62.14     26.07      0.87 ' 2964.10     0.65      1.52     67.11     28.15      0.94    3201.23      0.70      1.64


 POWER         CO               CO              THC               NO               NO               NO
PERCENT                          2                                                  2                X
 RATED    LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
 T.O.

  73         3.573          2556.222          0.0              5.868            0.524            6.392
  78         3.282          2626.052          0.0              6.090            0.499            6.589
  89         3.031          2696.090          0.0              7.046            0.564            8.549
   3       167.766          8003.078         70.380            1.755            2.340            4.095
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    CAL ID NUMBER:  311   ENGINE TYPE AND MODEL: CJ-805-3A          SERIAL NUMBER:  GE-161-108

TEST ORGANIZATION:  S W R I TWA


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL      LB CO /      ENERGY    LB CO /
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL    # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.040       448.0    49.689     779.294     1.000      19.00     15.735      246.78      63.761      141.87     0.11091
TAKEOFF     1.000     11200.0    33.853    9948.277     1.000       0.70      0.395      116.06       3.403      130.67     0.00302
CLIMBOUT    0.850      9520.0    32.388    8195.566     1.000       2.20      1.188      300.50       3.952      349.07     0.00340
APPROACH    0.400      4480.0    28.991    3833.509     1.000       4.00      1.933      255.57       7.563      298.67     0.00647
TAXI-IDLE   0.040       448.0    49.689     779.294     1.000       7.00      5.797       90.92      63.761       52.27     0.11091

                                 TOTAL FOR CYCLE:                          25.047     1009.83                  972.53
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           24.803
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          25.754
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         3.526


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL      LB HC /      ENERGY    LB HC /
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL    # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.040       448.0    21.254     779.294     1.000      19.00      6.730      246.78      27.273      141.87     0.04744
TAKEOFF     1.000     11200.0     1.134    9948.277     1.000       0.70      0.013      116.06       0.114      130.67     0.00010
CLIMBOUT    0.850      9520.0     0.934    8195.566     1.000       2.20      0.034      300.50       0.114      349.07     0.00010
APPROACH    0.400      4480.0     2.698    3833.509     1.000       4.00      0.180      255.57       0.704      298.67     0.00060
TAXI-IDLE   0.040       448.0    21.254     779.294     1.000       7.00      2.480       90.92      27.273       52.27     0.04744

                                 TOTAL FOR CYCLE:                           9.437     1009.83                  972.53
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            9.346
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           9.704
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         1.181


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      NOX        FUEL      LB NOX/      ENERGY    LB NOX/
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL    # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.040       448.0     0.866     779.294     1.000      19.00      0.274      246.78       1.111      141.87     0.00193
TAKEOFF     1.000     11200.0   104.178    9948.277     1.000       0.70      1.215      116.06      10.472      130.67     0.00930
CLIMBOUT    0.850      9520.0    71.064    8195.566     1.000       2.20      2.606      300.50       8.671      349.07     0.00746
APPROACH    0.400      4480.0    17.438    3833.509     1.000       4.00      1.163      255.57       4.549      298.67     0.00389
TAXI-IDLE   0.040       448.0     0.866     779.294     1.000       7.00      0.101       90.92       1.111       52.27     0.00193

                                 TOTAL FOR CYCLE:                           5.359     1009.83                  972.53
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            5.307
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           5.510
                                 LBS POLLUTANT/1000K LB TH AT T.O.:       108.519
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DATE:   8/ 4/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA *******************************************************************************************************

     CAL ID NUMBER:  312     ENGINE TYPE AND MODEL:  CJ-805-3A              SERIAL NUMBER:   GE-161-108

                              RATED THRUST:         11200.

     ENGINE TOTAL TIME:                            22738. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      0. HRS
          N2 COMPRESSOR OVERHAUL:                     -0. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
          N1 TURBINE OVERHAUL:                         0. HRS
          N2 TURBINE OVERHAUL:                        -0. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA *********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   78.00   FINISH   78.00

     ATMOSPHERIC PRESSURE:              START   29.04   FINISH   29.04

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0154

     RELATIVE HUMIDITY:                      66.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   4

COMMENTS:

F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
 DETERMINED BY SUBTRACTION.  THIS IS THE LAST OF FOUR TESTS ON THIS ENGINE.  THE
 FUEL USED DURING THIS TEST CONTAINED THE NORMAL CONCENTRATION OF CI-2 (0.2% BY
 VOLUME).


 ELAPSED    TEST           POWER                ENGINE            MEASURED    GAS GEN      CALC      COMPRESSOR     ENGINE       TURBINE
  TIME      MODE     THRUST,LBS  PERCENT         SPEED               FUEL     AIR FLOW      F/A      DISCHARGE     PRESSURE       INLET
                         OR       RATED           RPM                FLOW      LB/SEC                  TEMP         RATIO         TEMP
                        SHP       T.O.       N1          N2         LB/HR                           DEGREES F        EPR       DEGREES F

   0.0      1/ 0     8080.00        72    7140.00     7140.00     6650.00     147.80    0.012500       -0.00         -0.00         -0.00
  30.00     2/ 1     8820.00        78    7210.00     7210.00     7320.00     152.20    0.013300       -0.00         -0.00         -0.00
   5.00     3/ 2    10000.00        89    7400.00     7400.00     8590.00     162.00    0.014700       -0.00         -0.00         -0.00
   9.00     4/ 3      400.00         3    4510.00     4510.00     1090.00      44.50    0.006800       -0.00         -0.00         -0.00


 POWER    EXHAUST       EXHAUST          CO          CO         THC       NO          NO          NO      ALDEHYDES    SMOKE   PARTICULATES
PERCENT     GAS           GAS           (WET)         2        (WET)     (WET)         2           X
 RATED      TEMP        PRESSURE        PPMV       (WET)       PPMV      PPMV       (WET)       (WET)
 T.O.    DEGREES F        PSIA                   PERCENT V                          PPMV        PPMV

  72       981.00        16.40          65.00        2.53      0.0       50.00       4.00       54.00      -0.00      -0.00       -0.00
  78      1042.00        18.00          64.00        2.70      0.0       57.00       4.00       61.00      -0.00      -0.00       -0.00
  89      1134.00        20.80          65.00        2.98      0.0       71.00       4.00       75.00      -0.00      -0.00       -0.00
   3       728.00         0.50         492.00        1.38    372.00       2.00       6.00        8.00      -0.00      -0.00       -0.00


 POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
 RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LP/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
 T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

  72        5.11       0.0        0.52    3125.21       6.46       6.97      33.98       0.0         3.43   20782.66      42.94      46.37
  78        4.72       0.0        0.49    3125.83       6.90       7.38      34.52       0.0         3.54   22881.09      50.50      54.04
  89        4.34       0.0        0.44    3126.42       7.79       8.23      37.28       0.0         3.77   26855.95      66.89      70.66
   3       66.91      28.97       1.34    2948.63       0.45       1.79      72.93      31.58        1.46    3214.01       0.49       1.95


 POWER          CO                 CO                 THC                 NO                 NO                 NO
PERCENT                             2                                                          2                  X
 RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
 T.O.

  72            4.206           2572.112              0.0                5.314              0.425              5.739
  78            3.914           2594.228              0.0                5.725              0.402              6.127
  89            3.729           2685.595              0.0                6.689              0.377              7.066
   3          192.320           4035.016             78.951              1.217              3.652              4.869
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     CAL ID NUMBER:  312   ENGINE TYPE AND MODEL: CJ-805-3A            SERIAL NUMBER:  GE-161-108

 TEST ORGANIZATION:  S W R I TWA


   MODE   FRACTIONAL   POWER   EMISSION    FUEL      USAGE    TIME IN     CO       FUEL    LB CO /   ENERGY   LB CO /
            POWER      # TH      RATE      RATE    WT FACTOR   MODE      MASS      MASS   1K LB FUEL # TH-HR  # TH-HR
                                LB/HR     LB/HR                MIN.      LBS.      LBS.

 TAXI-IDLE  0.040      448.0   65.005    965.026    1.000     19.00    20.585    305.59    67.361   141.87    0.14510
 TAKEOFF    1.000    11200.0   36.430   9838.379    1.000      0.70    0.425     114.78     3.703   130.67    0.00325
 CLIMBOUT   0.850     9520.0   36.574   8220.949    1.000      2.20    1.341     301.43     4.449   349.07    0.00384
 APPROACH   0.400     4480.0   31.411   3738.900    1.000      4.00    2.094     249.26     8.401   298.67    0.00701
 TAXI-IDLE  0.040      448.0   65.005    965.026    1.000      7.00    7.584     112.59    67.361    52.27    0.14510

                               TOTAL FOR CYCLE:                        32.029   1083.65              972.53
                               LBS POLLUTANT/1K LB FUEL/CYCLE:         29.557
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:        32.934
                               LBS POLLUTANT/1000K LB TH AT T.O.:       3.795


   MODE   FRACTIONAL   POWER   EMISSION    FUEL      USAGE    TIME IN     HC       FUEL    LB HC /   ENERGY   LB HC /
            POWER      # TH      RATE      RATE    WT FACTOR   MODE      MASS      MASS   1K LB FUEL # TH-HR  # TH-HR
                                LB/HR     LB/HR                MIN.      LBS.      LBS.

 TAXI-IDLE  0.040      448.0   30.098    965.026    1.000     19.00    9.531     305.59    31.189   141.87    0.06718
 TAKEOFF    1.000    11200.0   0.0      9838.379    1.000      0.70    0.0       114.78     0.0     130.67    0.0
 CLIMBOUT   0.850     9520.0   0.0      8220.949    1.000      2.20    0.0       301.43     0.0     349.07    0.0
 APPROACH   0.400     4480.0    1.863   3738.900    1.000      4.00    0.124     249.26     0.498   298.67    0.00042
 TAXI-IDLE  0.040      448.0   30.098    965.026    1.000      7.00    3.511     112.59    31.189    52.27    0.06718

                               TOTAL FOR CYCLE:                        13.167   1083.65              972.53
                               LBS POLLUTANT/1K LB FUEL/CYCLE:         12.150
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:        13.539
                               LBS POLLUTANT/1000K LB TH AT T.O.:       0.0


   MODE   FRACTIONAL   POWER   EMISSION    FUEL      USAGE    TIME IN    NOX       FUEL    LB NOX/   ENERGY   LB NOX/
            POWER      # TH      RATE      RATE    WT FACTOR   MODE      MASS      MASS   1K LB FUEL # TH-HR  # TH-HR
                                LB/HR     LB/HR                MIN.      LBS.      LBS.

 TAXI-IDLE  0.040      448.0    1.257    965.026    1.000     19.00    0.398     305.59     1.303   141.87    0.00281
 TAKEOFF    1.000    11200.0   93.440   9838.379    1.000      0.70    1.090     114.78     9.498   130.67    0.00834
 CLIMBOUT   0.850     9520.0   66.583   8220.949    1.000      2.20    2.441     301.43     8.099   349.07    0.00699
 APPROACH   0.400     4480.0   16.798   3738.900    1.000      4.00    1.120     249.26     4.493   298.67    0.00375
 TAXI-IDLE  0.040      448.0    1.257    965.026    1.000      7.00    0.147     112.59     1.303    52.27    0.00281

                               TOTAL FOR CYCLE:                         5.196   1083.65              972.53
                               LBS POLLUTANT/1K LB FUEL/CYCLE:          4.795
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:         5.343
                               LBS POLLUTANT/1000K LB TH AT T.O.:      97.334
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DATE:   7/21/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A
ENGINE DATA ********************************************************************************************************************
     CAL ID NUMBER:  319    ENGINE TYPE AND MODEL:  CJ-805-3A                    SERIAL NUMBER:   161-255

                                 RATED THRUST:         11200.

     ENGINE TOTAL TIME:                                21747. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         0. HRS
          N2 COMPRESSOR OVERHAUL:                        -0. HRS
          COMBUSTOR CAN REPLACEMENT:                      0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
          N1 TURBINE OVERHAUL:                            0. HRS
          N2 TURBINE OVERHAUL:                           -0. HRS

     FUEL: JP-4 TF               FUEL H/C RATIO:   2.020
 OPERATIONAL DATA ********************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   75.00   FINISH   75.00

      ATMOSPHERIC PRESSURE:              START   28.93   FINISH   28.94

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0119

      RELATIVE HUMIDITY:                    58.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

      SAMPLE LINE TRANSPORT TIME, SEC:    1.00

  NUMBER OF TESTS:   4

  COMMENTS:

   A/F AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
  DETERMINED BY SUBTRACTION.


                              POWER                 ENGINE             MEASURED   GAS GEN      CALC    COMPRESSOR    ENGINE     TURBINE
  ELAPSED     TEST                                  SPEED                FUEL     AIR FLOW     F/A     DISCHARGE    PRESSURE     INLET
   TIME       MODE     THRUST,LBS  PERCENT           RPM                 FLOW     LB/SEC                 TEMP        RATIO       TEMP
                          OR        RATED                                LB/HR                        DEGREES F       EPR      DEGREES F
                          SHP       T.O.       N1          N2

    0.0        1/ 0     8220.00      73     7115.00     7115.00       6550.00     147.70    0.012300      -0.00        2.16       -0.00
    5.55       2/ 1     8560.00      76     7165.00     7165.00       6910.00     150.80    0.012700      -0.00        2.24       -0.00
   12.00       3/ 2     9940.00      88     7330.00     7330.00       8350.00     161.10    0.014400      -0.00        2.46       -0.00
   15.45       4/ 3      400.00       3     4530.00     4530.00       1060.00      36.40    0.008100      -0.00       -0.00       -0.00


                                                                               NO          NO      ALDEHYDES    SMOKE    PARTICULATES
  POWER     EXHAUST      EXHAUST          CO          CO        THC      NO        2            X
  PERCENT    GAS          GAS           (WET)         2        (WET)   (WET)    (WET)       (WET)
  RATED      TEMP       PRESSURE         PPMV       (WET)      PPMV    PPMV      PPMV        PPMV
  T.O.     DEGREES F      PSIA                     PERCENT V

   73        977.00      165.00         52.00       2.54       0.0     54.00     6.00       60.00     -0.00      -0.00      -0.00
   76       1002.00       17.50         44.00       2.59       0.0     59.00     5.00       64.00     -0.00      -0.00      -0.00
   88       1121.00       20.80         38.00       2.90       0.0     77.00     6.00       83.00     -0.00      -0.00      -0.00
    3        729.00        0.40        552.00       1.56     488.00     2.00     6.00        8.00     -0.00      -0.00      -0.00


                                                                             MASS EMI  MASS EMI  MASS EMI   MASS EMI   MASS EMI  MASS EMI
  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI       CO        HC        NO2        CO2         NO        NOX
  PERCENT     CO        HC        NO2       CO2        NO       NOX         LB/HR     LB/HR     LB/HR      LB/HR       LB/HR     LB/HR
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   73        4.07      0.0       0.77    3126.84     6.95      7.72      26.69      0.0       5.06    20480.79     45.52     50.58
   76        3.38      0.0       0.63    3127.93     7.45      8.08      23.37      0.0       4.36    21613.98     51.47     55.83
   88        2.61      0.0       0.68    3129.14     8.69      9.36      21.79      0.0       5.65    26128.32     72.52     78.18
    3       66.15     33.49      1.18    2937.42     0.39      1.57      70.12     35.50      1.25     3113.66      0.42      1.67


                                                                                    NO                  NO
  POWER          CO                  CO                THC              NO            2                   X
  PERCENT                             2
  RATED     LB/1K#TH-HR         LB/1K#TH-HR        LB/1K#TH-HR      LB/1K#TH-HR    LB/1K#TH-HR         LB/1K#TH-HR
  T.O.

   73            3.246            2491.581             0.0             5.538          0.615               6.153
   76            2.730            2524.998             0.0             6.013          0.510               6.523
   88            2.192            2624.604             0.0             7.296          0.569               7.865
    3          175.302            7784.148            88.759           1.043          3.130               4.173
    CAL ID NUMBER:  319   ENGINE TYPE AND MODEL: CJ-805-3A             SERIAL NUMBER:  161-255

TEST ORGANIZATION:  S W R I TWA

   MODE   FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      CO        FUEL      LB CO /    ENERGY   LB CO /
             POWER      # TH      RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.040       448.0    74.980   1106.440     1.000      19.00     23.744     350.37     67.767    141.87    0.16737
TAKEOFF     1.000     11200.0    28.087  10169.684     1.000       0.70      0.328     118.65      2.762    130.67    0.00251
CLIMBOUT    0.850      9520.0    22.659   8346.832     1.000       2.20      0.831     306.05      2.715    349.07    0.00238
APPROACH    0.400      4480.0    69.828   3239.294     1.000       4.00      4.655     215.95     21.557    298.67    0.01559
TAXI-IDLE   0.040       448.0    74.980   1106.440     1.000       7.00      8.748     129.08     67.767     52.27    0.16737

                               TOTAL FOR CYCLE:                            38.305    1120.11               972.53
                               LBS POLLUTANT/1K LB FUEL/CYCLE:             34.198
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:            39.387
                               LBS POLLUTANT/1000K LB TH AT T.O.:           7.926

   MODE   FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      HC        FUEL      LB HC /    ENERGY   LB HC /
             POWER      # TH      RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.040       448.0    40.331   1106.440     1.000      19.00     12.772     350.37     36.451    141.87    0.09003
TAKEOFF     1.000     11200.0     1.433  10169.684     1.000       0.70      0.017     118.65      0.141    130.67    0.00013
CLIMBOUT    0.850      9520.0     0.884   8346.832     1.000       2.20      0.032     306.05      0.106    349.07    0.00009
APPROACH    0.400      4480.0     0.642   3239.294     1.000       4.00      0.043     215.95      0.198    298.67    0.00014
TAXI-IDLE   0.040       448.0    40.331   1106.440     1.000       7.00      4.705     129.08     36.451     52.27    0.09003

                               TOTAL FOR CYCLE:                            17.569    1120.11               972.53
                               LBS POLLUTANT/1K LB FUEL/CYCLE:             15.685
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:            18.065
                               LBS POLLUTANT/1000K LB TH AT T.O.:           1.493

   MODE   FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL      LB NOX/    ENERGY   LB NOX/
             POWER      # TH      RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.040       448.0     1.847   1106.440     1.000      19.00      0.585     350.37      1.669    141.87    0.00412
TAKEOFF     1.000     11200.0   116.866  10169.684     1.000       0.70      1.363     118.65     11.492    130.67    0.01043
CLIMBOUT    0.850      9520.0    78.032   8346.832     1.000       2.20      2.861     306.05      9.349    349.07    0.00820
APPROACH    0.400      4480.0    16.295   3239.294     1.000       4.00      1.086     215.95      5.031    298.67    0.00364
TAXI-IDLE   0.040       448.0     1.847   1106.440     1.000       7.00      0.215     129.08      1.669     52.27    0.00412

                               TOTAL FOR CYCLE:                             6.111    1120.11               972.53
                               LBS POLLUTANT/1K LB FUEL/CYCLE:              5.456
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:             6.284
                               LBS POLLUTANT/1000K LB TH AT T.O.:         121.735
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DATE:   7/26/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA *******************************************************************************************************

     CAL ID NUMBER:  321    ENGINE TYPE AND MODEL:  JT3C-6                        SERIAL NUMBER:   630895

                            RATED THRUST:         11000.

     ENGINE TOTAL TIME:                               22290. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  5672. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      5672. HRS
          N2 COMPRESSOR OVERHAUL:                      5672. HRS
          COMBUSTOR CAN REPLACEMENT:                   5672. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      5672. HRS
          N1 TURBINE OVERHAUL:                         5672. HRS
          N2 TURBINE OVERHAUL:                         5672. HRS

     FUEL: JP-4 TF               FUEL H/C RATIO:   2.020

OPERATIONAL DATA ********************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   75.00   FINISH   82.00

      ATMOSPHERIC PRESSURE:              START   29.01   FINISH   29.01

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0093

      RELATIVE HUMIDITY:                    42.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

      SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:   4

 COMMENTS:

  A/F AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
  DETERMINED BY SUBTRACTION.


 ELAPSED    TEST          POWER               ENGINE             MEASURED    GAS GEN      CALC    COMPRESSOR     ENGINE      TURBINE
  TIME      MODE    THRUST,LBS  PERCENT        SPEED               FUEL     AIR FLOW      F/A     DISCHARGE    PRESSURE      INLET
                        OR       RATED          RPM                FLOW      LB/SEC                  TEMP        RATIO        TEMP
                       SHP       T.O.      N1          N2          LB/HR                          DEGREES F       EPR       DEGREES F

    0.0     1/ 0    6800.00        61    5730.00    9120.00     5730.00     144.00    0.011100      -0.00        1.96         -0.00
   12.00    2/ 1    7920.00        71    5920.00    9270.00     6400.00     152.10    0.011700      -0.00        2.11         -0.00
   16.50    3/ 2    9740.00        88    6330.00    9520.00     8120.00     167.00    0.013700      -0.00        2.40         -0.00
   19.00    4/ 3     460.00         4    2320.00    6220.00     1110.00      35.00    0.008800      -0.00        1.10         -0.00


 POWER     EXHAUST      EXHAUST         CO         CO        THC       NO         NO         NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS          GAS          (WET)        2        (WET)     (WET)        2          X
 RATED      TEMP       PRESSURE        PPMV      (WET)       PPMV      PPMV      (WET)      (WET)
 T.O.    DEGREES F       PSIA                  PERCENT V                          PPMV       PPMV

   61      869.00       13.40         38.00       2.23       0.0       46.00      6.00      52.00     -0.00      -0.00      -0.00
   71      925.00       15.60         28.00       2.34       0.0       55.00      3.00      58.00     -0.00      -0.00      -0.00
   88     1081.00       20.00         11.00       2.76       0.0       73.00      0.0       73.00     -0.00      -0.00      -0.00
    4      541.00        0.70        714.00       1.53    2160.00       2.00      6.00       8.00     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2        NO       NOX       CO        HC        NO2       CO2        NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   61       3.39      0.0       0.88    3127.91      6.75      7.62     19.44      0.0        5.04   17922.93     38.65     43.69
   71       2.38      0.0       0.42    3129.50      7.69      8.11     15.25      0.0        2.68   20028.77     49.21     51.90
   88       0.79      0.0       0.0     3131.99      8.66      8.66      6.45      0.0        0.0    25431.77     70.32     70.32
    4      78.34    135.74      1.08    2637.76      0.36      1.44     86.96    150.67      1.20    2927.91      0.40      1.60


 POWER          CO               CO               THC                NO               NO               NO
PERCENT                           2                                                    2                X
 RATED     LB/1K#TH-HR      LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
 T.O.

   61          2.859          2635.725            0.0               5.684            0.741            6.425
   71          1.926          2528.885            0.0               6.214            0.339            6.553
   88          0.662          2611.065            0.0               7.220            0.0              7.220
    4        189.046          6365.020          327.544             0.870            2.609            3.479
   CAL ID NUMBER:  321   ENGINE TYPE AND MODEL: JT3C-6                 SERIAL NUMBER:  630895

TEST ORGANIZATION:  S W R I TWA

  MODE     FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     CO         FUEL     LB CO /     ENERGY   LB CO /
             POWER       # TH       RATE      RATE     WT FACTOR    MODE      MASS        MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                  MIN.      LBS.        LBS.

TAXI-IDLE   0.050        550.0    83.434   1165.353     1.000      19.00    26.421      369.03     71.595     174.17    0.15170
TAKEOFF     1.000      11000.0     2.812   9352.891     1.000       0.70     0.033      109.12      0.301     128.33    0.00026
CLIMBOUT    0.850       9350.0     9.641   7787.633     1.000       2.20     0.354      285.55      1.238     342.83    0.00103
APPROACH    0.400       4400.0    32.132   4054.447     1.000       4.00     2.142      270.30      7.925     293.33    0.00730
TAXI-IDLE   0.050        550.0    83.434   1165.353     1.000       7.00     9.734      135.96     71.595      64.17    0.15170

                                 TOTAL FOR CYCLE:                          38.683    1169.95                1002.83
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           33.064
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          38.574
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         0.298

  MODE     FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     HC         FUEL     LB HC /     ENERGY   LB HC /
             POWER       # TH       RATE      RATE     WT FACTOR    MODE      MASS        MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                  MIN.      LBS.        LBS.

TAXI-IDLE   0.050        550.0   167.968   1165.353     1.000      19.00    53.190      369.03    144.135     174.17    0.30540
TAKEOFF     1.000      11000.0     2.647   9352.891     1.000       0.70     0.031      109.12      0.283     128.33    0.00024
CLIMBOUT    0.850       9350.0     1.337   7787.633     1.000       2.20     0.049      285.55      0.172     342.83    0.00014
APPROACH    0.400       4400.0     2.222   4054.447     1.000       4.00     0.148      270.30      0.548     293.33    0.00050
TAXI-IDLE   0.050        550.0   167.968   1165.353     1.000       7.00    19.596      135.96    144.135      64.17    0.30540

                                 TOTAL FOR CYCLE:                          73.014    1169.95                1002.83
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           62.408
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          72.008
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         2.807

  MODE     FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY   LB NOX/
             POWER       # TH       RATE      RATE     WT FACTOR    MODE      MASS        MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                  MIN.      LBS.        LBS.

TAXI-IDLE   0.050        550.0     1.751   1165.353     1.000      19.00     0.555      369.03      1.503     174.17    0.00318
TAKEOFF     1.000      11000.0    80.760   9352.891     1.000       0.70     0.942      109.12      8.635     128.33    0.00734
CLIMBOUT    0.850       9350.0    67.122   7787.633     1.000       2.20     2.461      285.55      8.619     342.83    0.00718
APPROACH    0.400       4400.0    23.970   4054.447     1.000       4.00     1.598      270.30      5.912     293.33    0.00545
TAXI-IDLE   0.050        550.0     1.751   1165.353     1.000       7.00     0.204      135.96      1.503      64.17    0.00318

                                 TOTAL FOR CYCLE:                           5.760    1169.95                1002.83
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            4.923
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           5.744
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        85.654
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DATE:   7/13/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:  111     ENGINE TYPE AND MODEL:  JT 3C - 7                    SERIAL NUMBER:   T6313298

                             RATED THRUST:         12000.

     ENGINE TOTAL TIME:                             24419. HRS

     TIME SINCE HOT SECTION OVERHAUL:                9130. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                    9130. HRS
          N2 COMPRESSOR OVERHAUL:                    9130. HRS
          COMBUSTOR CAN REPLACEMENT:                 9130. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    9130. HRS
          N1 TURBINE OVERHAUL:                       9130. HRS
          N2 TURBINE OVERHAUL:                       9130. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA *******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   85.00   FINISH   83.00

     ATMOSPHERIC PRESSURE:        ..    START   28.91   FINISH   28.91

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0191

     RELATIVE HUMIDITY:                        73.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   7

COMMENTS:

 F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FIRST, THIRD AND LAST
 RUNS.  NO2 DETERMINED BY SUBTRACTION


ELAPSED    TEST           POWER               ENGINE           MEASURED    GAS GEN      CALC      COMPRESSOR     ENGINE       TURBINE
 TIME      MODE    THRUST,LBS  PERCENT         SPEED              FUEL     AIR FLOW      F/A      DISCHARGE     PRESSURE       INLET
                       OR       RATED          RPM                FLOW      LB/SEC                   TEMP         RATIO         TEMP
                      SHP       T.O.       N1          N2         LB/HR                           DEGREES F       EPR       DEGREES F

   1.00    4/ 0     360.00        2     2105.00    5780.00      980.00      36.30    0.007500      -0.00          1.10          -0.00
   4.45    5/ 4    8220.00       68     6010.00    9340.00     6860.00     152.90    0.012500      -0.00          2.20          -0.00
   6.30    4/ 5     440.00        3     2260.00    6020.00      990.00      37.20    0.007400      -0.00          1.10          -0.00
  15.00    1/ 4    6480.00       53     5710.00    9110.00     5400.00     140.10    0.010700      -0.00          1.93          -0.00
  18.00    2/ 1    7140.00       59     5830.00    9170.00     6070.00     145.80    0.011600      -0.00          2.04          -0.00
  22.30    3/ 2    9500.00       79     6300.00    9620.00     8050.00     163.30    0.013700      -0.00          2.40          -0.00
  27.00    4/ 3     560.00        4     2115.00    6420.00     1210.00      43.70    0.007700      -0.00          1.11          -0.00


 POWER    EXHAUST      EXHAUST         CO          CO        THC       NO        NO        NO     ALDEHYDES    SMOKE    PARTICULATES
PERCENT     GAS          GAS          (WET)         2       (WET)     (WET)       2         X
 RATED     TEMP        PRESSURE       PPMV       (WET)      PPMV      PPMV     (WET)     (WET)
 T.O.    DEGREES F       PSIA                  PERCENT V                        PPMV      PPMV

   2       580.00        0.40       785.00       1.26   1730.00      2.00      5.00      7.00     -0.00      -0.00       -0.00
  68       993.00       16.40        33.00       2.35     16.00     51.00      4.00     55.00     -0.00      -0.00       -0.00
   3       555.00        0.40       694.00       1.26   1550.00      1.00      6.00      7.00     -0.00      -0.00       -0.00
  53       870.00       12.60        45.00       2.10     17.00     33.00      9.00     42.00     -0.00      -0.00       -0.00
  59       937.00       14.10        50.00       2.31     11.00     43.00      6.00     49.00     -0.00      -0.00       -0.00
  79      1085.00       19.50        28.00       2.66     11.00     71.00      3.00     74.00     -0.00      -0.00       -0.00
   4       507.00        0.60       640.00       1.37   1020.00      1.00      6.00      7.00     -0.00      -0.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   2      103.57    130.72      1.08   2611.90      0.43      1.52    101.49    128.10      1.06   2559.66      0.42      1.49
  68        2.79      0.78      0.56   3126.72      7.09      7.65     19.17      5.32      3.82  21449.31     48.66     52.48
   3       93.23    119.26      1.32   2659.58      0.22      1.54     92.30    118.06      1.31   2632.99      0.22      1.53
  53        4.26      0.92      1.40   3124.02      5.13      6.53     23.01      4.98      7.56  16869.70     27.71     35.27
  59        4.30      0.54      0.85   3124.99      6.08      6.93     26.13      3.29      5.15  18968.68     36.91     42.06
  79        2.10      0.47      0.37   3128.65      8.73      9.10     16.87      3.80      2.97  25185.66     70.28     73.25
   4       83.09     75.84      1.28   2794.63      0.21      1.49    100.54     91.77      1.55   3381.50      0.26      1.81


 POWER          CO                 CO               THC                NO                NO                NO
PERCENT                             2                                                      2                 X
 RATED     LB/1K*TH-HR        LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR
 T.O.

   2         281.930           7110.168           355.846             1.180             2.950             4.129
  68           2.332           2639.406             0.648             5.920             0.464             6.384
   3         209.772           5984.059           268.327             0.496             2.979             3.475
  53           3.550           2603.349             0.768             4.277             1.166             5.443
  59           3.560           2656.678             0.461             5.170             0.721             5.891
  79           1.776           2651.123             0.430             7.399             0.313             7.710
   4         179.532           6038.383           163.873             0.461             2.765             3.225
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CAL ID NUMBER: 111 ENGINE TYPE AND MODEL: JT 3C - 7 SERIAL NUMBER: T6313298

TEST ORGANIZATION: S W R I TWA

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	CO MASS LBS.	FUEL MASS LBS.	LB CO / 1K LB FUEL	ENERGY # TH-HR	LB CO / # TH-HR
TAXI-IDLE	0.050	600.0	84.934	1060.352	1.000	19.00	26.896	335.78	80.100	190.00	0.14156
TAKEOFF	1.000	12000.0	17.805	10598.488	1.000	0.70	0.208	123.65	1.680	140.00	0.00148
CLIMBOUT	0.850	10200.0	18.355	8797.383	1.000	2.20	0.673	322.57	2.086	374.00	0.00180
APPROACH	0.400	4800.0	20.116	4481.520	1.000	4.00	1.341	298.77	4.489	320.00	0.00419
TAXI-IDLE	0.050	600.0	84.934	1060.352	1.000	7.00	9.909	123.71	80.100	70.00	0.14156
			TOTAL FOR CYCLE:				39.027	1204.47		1094.00	
			LBS POLLUTANT/1K LB FUEL/CYCLE:				32.401				
			LBS POLLUTANT/1K LB TH-HR/CYCLE:				35.673				
			LBS POLLUTANT/1000K LB TH AT T.O.:				1.731				

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	HC MASS LBS.	FUEL MASS LBS.	LB HC / 1K LB FUEL	ENERGY # TH-HR	LB HC / $ TH-HR
TAXI-IDLE	0.050	600.0	109.896	1060.352	1.000	19.00	34.800	335.78	103.641	190.00	0.18316
TAKEOFF	1.000	12000.0	2.975	10598.488	1.000	0.70	0.035	123.65	0.281	140.00	0.00025
CLIMBOUT	0.850	10200.0	0.698	8797.383	1.000	2.20	0.026	322.57	0.079	374.00	0.00007
APPROACH	0.400	4800.0	3.504	4481.520	1.000	4.00	0.234	298.77	0.782	320.00	0.00073
TAXI-IDLE	0.050	600.0	109.896	1060.352	1.000	7.00	12.821	123.71	103.641	70.00	0.18316
			TOTAL FOR CYCLE:				47.915	1204.47		1094.00	
			LBS POLLUTANT/1K LB FUEL/CYCLE:				39.781				
			LBS POLLUTANT/1K LB TH-HR/CYCLE:				43.798				
			LBS POLLUTANT/1000K LB TH AT T.O.:				2.892				

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	NOX MASS LBS.	FUEL MASS LBS.	LB NOX/ 1K LB FUEL	ENERGY # TH-HR	LB NOX/ # TH-HR
TAXI-IDLF	0.050	600.0	1.718	1060.352	1.000	19.00	0.544	335.78	1.620	190.00	0.00286
TAKEOFF	1.000	12000.0	135.724	10598.488	1.000	0.70	1.583	123.65	12.806	140.00	0.01131
CLIMBOUT	0.850	10200.0	89.414	8797.383	1.000	2.20	3.279	322.57	10.164	374.00	0.00877
APPROACH	0.400	4800.0	23.307	4481.520	1.000	4.00	1.554	298.77	5.201	320.00	0.00486
TAXI-IDLE	0.050	600.0	1.718	1060.352	1.000	7.00	0.200	123.71	1.620	70.00	0.00286
			TOTAL FOR CYCLE:				7.160	1204.47		1094.00	
			LBS POLLUTANT/1K LB FUEL/CYCLE:				5.945				
			LBS POLLUTANT/1K LB TH-HR/CYCLE:				6.545				
			LBS POLLUTANT/1000K LB TH AT T.O.:				131.954				

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DATE:   7/15/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  113    ENGINE TYPE AND MODEL:  JT 3C - 7                SERIAL NUMBER:   6313298

                            RATED THRUST:         12000.

     ENGINE TOTAL TIME:                           24419. HRS

     TIME SINCE HOT SECTION OVERHAUL:              9130. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                  9130. HRS
          N2 COMPRESSOR OVERHAUL:                  9130. HRS
          COMBUSTOR CAN REPLACEMENT:               9130. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:  9130. HRS
          N1 TURBINE OVERHAUL:                     9130. HRS
          N2 TURBINE OVERHAUL:                     9130. HRS

     FUEL: JP-4 TF            FUEL H/C RATIO:   2.020

OPERATIONAL DATA ****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   86.00   FINISH   86.00

     ATMOSPHERIC PRESSURE:              START   28.89   FINISH   28.89

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0147

     RELATIVE HUMIDITY:                    53.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

 F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
 DETERMINED BY SUBTRACTION.


 ELAPSED    TEST          POWER             ENGINE           MEASURED   GAS GEN     CALC    COMPRESSOR   ENGINE     TURBINE
  TIME      MODE    THRUST,LBS  PERCENT     SPEED              FUEL     AIR FLOW    F/A     DISCHARGE   PRESSURE     INLET
                        OR       RATED       RPM               FLOW     LB/SEC                 TEMP       RATIO       TEMP
                       SHP       T.O.     N1        N2         LB/HR                        DEGREES F     EPR     DEGREES F

   0.0      1/ 0    6520.00       54   5710.00   9090.00    5560.00    139.90    0.011000     -0.00       1.95       -0.00
   7.00     2/ 1    7360.00       61   5860.00   9240.00    6160.00    146.50    0.011700     -0.00       2.06       -0.00
  20.00     3/ 2    9560.00       79   6290.00   9610.00    8100.00    162.50    0.013800     -0.00       2.44       -0.00
  25.00     4/ 3     360.00        2   2300.00   5870.00    1120.00     37.50    0.008300     -0.00       1.10       -0.00
  30.00     5/ 4    8400.00       69   6050.00   9360.00    7070.00    153.50    0.012800     -0.00       2.25       -0.00


 POWER    EXHAUST      EXHAUST         CO        CO       THC      NO       NO        NO      ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS          GAS          (WET)       2      (WET)   (WET)       2         X
 RATED      TEMP       PRESSURE       PPMV      (WET)     PPMV    PPMV     (WET)     (WET)
 T.O.    DEGREES F       PSIA                 PERCENT V                     PPMV      PPMV

  54       692.00       12.80         39.00     2.17     24.00    43.00     0.0      43.00     -0.00      -0.00      -0.00
  61       730.00       14.60          8.00     2.38     19.00    47.00     1.00     48.00     -0.00      -0.00      -0.00
  79      1077.00       19.60          5.00     2.67     13.00    69.00     1.00     70.00     -0.00      -0.00      -0.00
   2       537.00        0.50        768.00     1.40   1930.00     3.00     3.00      6.00     -0.00      -0.00      -0.00
  69      1005.00       17.00         23.00     2.49     13.00    57.00     1.00     58.00     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2        NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR      LB/HR     LB/HR
 T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  54        3.57      1.26      0.0    3124.17      6.47      6.47     14.87      7.00      0.0    17370.39     35.98     35.98
  61        0.67      0.91      0.14   3129.69      6.46      6.60      4.12      5.61      0.85   19278.89     39.80     40.65
  79        0.37      0.56      0.12   3131.13      8.46      8.58      3.02      4.50      0.99   25362.15     68.52     69.51
   2       91.72    132.01      0.59   2626.98      0.59      1.18    102.72    147.85      0.66    2942.22      0.66      1.32
  69        1.84      0.69      0.13   3128.72      7.49      7.62     13.00      4.21      0.93   22120.04     52.94     53.86


 POWER         CO                 CO                THC                NO                 NO                NO
PERCENT                            2                                                       2                 X
 RATED    LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

  54          3.047           2664.170            1.074              5.519             0.0               5.519
  61          0.560           2619.415            0.762              5.408             0.115             5.523
  79          0.316           2652.945            0.471              7.167             0.104             7.271
   2        285.344           8172.840          410.696              1.831             1.831             3.662
  69          1.548           2633.338            0.501              6.302             0.111             6.412
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    CAL ID NUMBER:  113   ENGINE TYPE AND MODEL: JT 3C - 7               SERIAL NUMBER:  6313298

TEST ORGANIZATION:  S W R I TWA

   MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      CO        FUEL    LB CO /     ENERGY    LB CO /
              POWER       # TH       RATE       RATE     WT FACTOR     MODE      MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                     LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE    0.050       600.0     18.307    1247.862     1.000       19.00     5.797     395.16     14.671     190.00    0.03051
TAKEOFF      1.000     12000.0      0.0     10455.684     1.000        0.70     0.0       121.98      0.0       140.00    0.0
CLIMBOUT     0.850     10200.0      0.0      8763.449     1.000        2.20     0.0       321.33      0.0       374.00    0.0
APPROACH     0.400      4800.0     22.365    4388.551     1.000        4.00     1.491     292.57      5.096     320.00    0.00466
TAXI-IDLE    0.050       600.0     18.307    1247.862     1.000        7.00     2.136     145.58     14.671      70.00    0.03051

                                   TOTAL FOR CYCLE:                             9.424    1276.62               1094.00
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:              7.382
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:             8.614
                                   LBS POLLUTANT/1000K LB TH AT T.O.:           0.0


   MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      HC        FUEL    LB HC /     ENERGY    LB HC /
              POWER       # TH       RATE       RATE     WT FACTOR     MODE      MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                     LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE    0.050       600.0     12.502    1247.862     1.000       19.00     3.959     395.16     10.019     190.00    0.02084
TAKEOFF      1.000     12000.0      0.0     10455.684     1.000        0.70     0.0       121.98      0.0       140.00    0.0
CLIMBOUT     0.850     10200.0      1.681    8763.449     1.000        2.20     0.062     321.33      0.192     374.00    0.00016
APPROACH     0.400      4800.0      6.920    4388.551     1.000        4.00     0.461     292.57      1.577     320.00    0.00144
TAXI-IDLE    0.050       600.0     12.502    1247.862     1.000        7.00     1.459     145.58     10.019      70.00    0.02084

                                   TOTAL FOR CYCLE:                             5.941    1276.62               1094.00
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:              4.653
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:             5.430
                                   LBS POLLUTANT/1000K LB TH AT T.O.:           0.0


   MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      NOX       FUEL    LB NOX/     ENERGY    LB NOX/
              POWER       # TH       RATE       RATE     WT FACTOR     MODE      MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                     LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE    0.050       600.0      1.679    1247.862     1.000       19.00     0.532     395.16      1.345     190.00    0.00280
TAKEOFF      1.000     12000.0    104.248   10455.684     1.000        0.70     1.216     121.98      9.970     140.00    0.00869
CLIMBOUT     0.850     10200.0     78.200    8763.449     1.000        2.20     2.867     321.33      8.923     374.00    0.00767
APPROACH     0.400      4800.0     22.579    4388.551     1.000        4.00     1.505     292.57      5.145     320.00    0.00470
TAXI-IDLE    0.050       600.0      1.679    1247.862     1.000        7.00     0.196     145.58      1.345      70.00    0.00280

                                   TOTAL FOR CYCLE:                             6.316    1276.62               1094.00
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:              4.948
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:             5.773
                                   LBS POLLUTANT/1000K LB TH AT T.O.:         101.352
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DATE:    7/26/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA *******************************************************************************************************

     CAL ID NUMBER:  138    ENGINE TYPE AND MODEL:  JT 3C - 7                    SERIAL NUMBER:    632275

                             RATED THRUST:         12000.

     ENGINE TOTAL TIME:                            19558. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                  12975. HRS
          N2 COMPRESSOR OVERHAUL:                    974. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     -0. HRS
          N1 TURBINE OVERHAUL:                      3366. HRS
          N2 TURBINE OVERHAUL:                      3867. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   66.20   FINISH   62.60

     ATMOSPHERIC PRESSURE:              START   29.92   FINISH   29.98

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0

     RELATIVE HUMIDITY:                   65.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:     5.00

     SAMPLE LINE TRANSPORT TIME, SEC:     5.00

NUMBER OF TESTS:   4

COMMENTS:

 REPAIRED ENGINE, NOT CARBO-BLASTED
EXHAUST GAS TEMPERATURE IN DEGREES C
 EXHAUST GAS PRESSURE IN INCHES HG.
JT3C-7 PROBE USED


 CLOCK      TEST          POWER                  ENGINE              MEASURED    GAS GEN      CALC    COMPRESSOR     ENGINE       TURBINE
  TIME      MODE     THRUST,LBS  PERCENT          SPEED                FUEL     AIR FLOW      F/A     DISCHARGE    PRESSURE       INLET
                         OR       RATED            RPM                 FLOW      LB/SEC                 TEMP         RATIO         TEMP
                        SHP       T.O.       N1           N2          LB/HR                          DEGREES F       EPR       DEGREES F

1631.00     1/ 0    7677.00        63     5835.00     9223.00      6295.00      -0.00   -0.000000      -0.00          2.13          -0.00
1637.00     2/ 1    9113.00        75     6088.00     9439.00      7530.00      -0.00   -0.000000      -0.00          2.37          -0.00
1642.00     3/ 2   10618.00        88     6387.00     9698.00      8951.00      -0.00   -0.000000      -0.00          2.62          -0.00
1721.00     4/ 3     442.00         3     2294.00     6068.00      1201.00      -0.00   -0.000000      -0.00         -0.00          -0.00


 POWER     EXHAUST      EXHAUST          CO         CO        THC       NO        NO         NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT      GAS          GAS           (WET)        2       (WET)    (WET)       2          X
 RATED       TEMP       PRESSURE         PPMV      (WET)      PPMV     PPMV     (WET)      (WET)
 T.O.     DEGREES F       PSIA                   PERCENT V                      PPMV       PPMV

   63      466.00        62.10          50.00      2.42       2.94     58.00    -0.00      62.40     -0.00      -0.00      -0.00
   75      513.00        68.90          50.00      2.65       2.40     74.00    -0.00      78.00     -0.00      -0.00      -0.00
   88      569.00        75.80          45.00      3.00       2.40     92.40    -0.00      98.40     -0.00      -0.00      -0.00
    3      273.00        31.60         810.00      1.25    1560.00      9.40    -0.00       9.80     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   63       4.14      0.14     -0.00   3149.00      7.89      8.49     26.07      0.88     -0.00  19822.96     49.67     53.43
   75       3.78      0.10     -0.00   3149.66      9.19      9.69     28.48      0.78     -0.00  23716.96     69.24     72.98
   88       3.01      0.09     -0.00   3150.91     10.15     10.80     26.93      0.82     -0.00  28203.80     90.81     96.71
    3     109.41    120.68     -0.00   2652.90      2.09      2.17    131.40    144.94     -0.00   3186.13      2.50      2.61


 POWER           CO                 CO               THC               NO               NO               NO
PERCENT                              2                                                    2                X
 RATED      LB/1K#TH-HR        LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
 T.O.

   63           3.395           2592.124            0.114             6.470           -0.000            6.960
   75           3.125           2602.541            0.086             7.597           -0.000            8.008
   88           2.536           2656.225            0.077             8.553           -0.000            9.108
    3         297.289           7208.449          327.917             5.667           -0.000            5.908
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     CAL ID NUMBER:  138   ENGINE TYPE AND MODEL: JT 3C - 7              SERIAL NUMBER:   632275

TEST ORGANIZATION:  UNITED/EPA

   MODE    FRACTIONAL     POWER    EMISSION    FUEL        USAGE     TIME IN      CO        FUEL     LB CO /      ENERGY    LB CO /
              POWER       # TH       RATE      RATE      WT FACTOR     MODE      MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE    0.050        600.0   125.910   1317.390     1.000        19.00    39.872     417.17      95.575     190.00    0.20985
TAKEOFF      1.000      12000.0    19.916  10326.199     1.000         0.70     0.232     120.47       1.929     140.00    0.00166
CLIMBOUT     0.850      10200.0    23.257   8612.996     1.000         2.20     0.853     315.81       2.700     374.00    0.00228
APPROACH     0.400       4800.0    55.184   4190.543     1.000         4.00     3.679     279.37      13.169     320.00    0.01150
TAXI-IDLE    0.050        600.0   125.910   1317.390     1.000         7.00    14.690     153.70      95.575      70.00    0.20985

                                  TOTAL FOR CYCLE:                             59.325    1286.52                1094.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:              46.113
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:             54.228
                                  LBS POLLUTANT/1000K LB TH AT T.O.:            1.936


   MODE    FRACTIONAL     POWER    EMISSION    FUEL        USAGE     TIME IN      HC        FUEL     LB HC /      ENERGY    LB HC /
              POWER       # TH       RATE      RATE      WT FACTOR     MODE      MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE    0.050        600.0   124.746   1317.390     1.000        19.00    39.503     417.17      94.692     190.00    0.20791
TAKEOFF      1.000      12000.0     0.0    10326.199     1.000         0.70     0.0       120.47       0.0       140.00    0.0
CLIMBOUT     0.850      10200.0     1.414   8612.996     1.000         2.20     0.052     315.81       0.164     374.00    0.00014
APPROACH     0.400       4800.0    20.937   4190.543     1.000         4.00     1.396     279.37       4.996     320.00    0.00436
TAXI-IDLE    0.050        600.0   124.746   1317.390     1.000         7.00    14.554     153.70      94.692      70.00    0.20791

                                  TOTAL FOR CYCLE:                             55.504    1286.52                1094.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:              43.143
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:             50.735
                                  LBS POLLUTANT/1000K LB TH AT T.O.:            0.0


   MODE    FRACTIONAL     POWER    EMISSION    FUEL        USAGE     TIME IN     NOX        FUEL     LB NOX/      ENERGY    LB NOX/
              POWER       # TH       RATE      RATE      WT FACTOR     MODE      MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE    0.050        600.0     2.990   1317.390     1.000        19.00     0.947     417.17       2.270     190.00    0.00498
TAKECFF      1.000      12000.0   125.078  10326.199     1.000         0.70     1.459     120.47      12.113     140.00    0.01042
CLIMBOUT     0.850      10200.0    90.517   8612.996     1.000         2.20     3.319     315.81      10.509     374.00    0.00887
APPROACH     0.400       4800.0    24.481   4190.543     1.000         4.00     1.632     279.37       5.842     320.00    0.00510
TAXI-IDLE    0.050        600.0     2.990   1317.390     1.000         7.00     0.349     153.70       2.270      70.00    0.00498

                                  TOTAL FOR CYCLE:                              7.706    1286.52                1094.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:               5.990
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:              7.044
                                  LBS POLLUTANT/1000K LB TH AT T.O.:          121.603
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DATE:   7/21/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  405    ENGINE TYPE AND MODEL:  JT 3C - 7                    SERIAL NUMBER:    633559

                            RATED THRUST:        12000.

     ENGINE TOTAL TIME:                          16968. HRS

     TIME SINCE HOT SECTION OVERHAUL:            16968. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                11043. HRS
          N2 COMPRESSOR OVERHAUL:                17125. HRS
          COMBUSTOR CAN REPLACEMENT:                 0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    0. HRS
          N1 TURBINE OVERHAUL:                       0. HRS
          N2 TURBINE OVERHAUL:                       0. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   55.40   FINISH   57.02

     ATMOSPHERIC PRESSURE:              START   29.87   FINISH   29.96

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0091

     RELATIVE HUMIDITY:                      94.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    5.00

     SAMPLE LINE TRANSPORT TIME, SEC:    5.00

 NUMBER OF TESTS:   4

 COMMENTS:

  EXHAUST GAS PRESSURE IN INCHES HG.
  REGULAR PRODUCTION ENGINE


  CLOCK      TEST          POWER                   ENGINE            MEASURED   GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
   TIME      MODE     THRUST,LBS  PERCENT          SPEED               FUEL     AIR FLOW      F/A     DISCHARGE    PRESSURE      INLET
                          OR       RATED            RPM                FLOW      LB/SEC                 TEMP        RATIO        TEMP
                         SHP       T.O.       N1          N2          LB/HR                           DEGREES F      EPR       DEGREES F

  622.00     1/ 0     7784.00       64     5818.00     9257.00      6307.00    -0.00    -0.000000       -0.00        2.15         -0.00
  627.00     2/ 1     9170.00       75     6059.00     9468.00      7440.00    -0.00    -0.000000       -0.00        2.37         -0.00
  633.00     3/ 2    10743.00       89     6384.00     9753.00      9020.00    -0.00    -0.000000       -0.00        2.64         -0.00
  739.00     4/ 3      436.00        3     2269.00     6050.00      1135.00    -0.00    -0.000000       -0.00       -0.00         -0.00


  POWER    EXHAUST      EXHAUST         CO         CO        THC       NO        NO         NO      ALDEHYDES   SMOKE    PARTICULATES
 PERCENT    GAS          GAS          (WET)        2        (WET)    (WET)       2          X
  RATED     TEMP       PRESSURE        PPMV      (WET)      PPMV     PPMV      (WET)      (WET)
  T.O.   DEGREES F       PSIA                  PERCENT V                       PPMV       PPMV

   64      847.20       62.60         60.00       2.25      1.95     54.00     -0.00      64.00      -0.00       -0.00      -0.00
   75      948.20       68.70         40.00       2.45      1.26     70.00     -0.00      79.00      -0.00       -0.00      -0.00
   89     1067.00       76.10         30.00       2.75      1.30    102.00     -0.00     110.00      -0.00       -0.00      -0.00
    3      492.90       31.60        800.00       1.20   1200.00      7.00     -0.00       9.60      -0.00       -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   64        5.34      0.10     -0.00    3147.22      7.93      9.36     43.69      0.63     -0.00   19849.54     49.80     59.02
   75        3.27      0.06     -0.00    3150.58      9.41     10.67     24.36      0.44     -0.00   23440.33     70.01     79.01
   89        2.19      0.05     -0.00    3152.30     12.22     13.18     19.74      0.49     -0.00   28433.76    110.25    118.90
    3      114.77     98.60     -0.00    2705.05      1.65      2.26    130.27    111.91     -0.00    3070.23      1.97      2.57


  POWER          CO               CO               THC               NO               NO               NO
 PERCENT                           2                                                   2                X
  RATED     LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR
  T.O.

   64          4.128         2559.643            0.081            6.398           -0.000            7.583
   75          2.671         2570.212            0.048            7.677           -0.000            8.664
   89          1.938         2646.724            0.046           10.263           -0.000           11.068
    3        298.782         7041.809          256.679            4.294           -0.000            5.889
    CAL ID NUMBER:  405   ENGINE TYPE AND MODEL: JT 3C - 7              SERIAL NUMBER:   633559

TEST ORGANIZATION:  UNITED/EPA


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      CO         FUEL     LB CO /     ENERGY   LB CO /
            POWER       # TH      RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   # TH-HR  # TH-HR
                                 LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.050      600.0  118.586    1174.937     1.000       19.00    37.552      372.06    100.930     190.00    0.19764
TAKEOFF     1.000    12000.0    5.362   10374.938     1.000        0.70     0.063      121.04      0.517     140.00    0.00045
CLIMBOUT    0.850    10200.0   19.603    8646.199     1.000        2.20     0.719      317.03      2.267     374.00    0.00192
APPROACH    0.400     4800.0   76.490    3920.626     1.000        4.00     5.099      261.38     19.510     320.00    0.01594
TAXI-IDLE   0.050      600.0  118.586    1174.937     1.000        7.00    13.835      137.08    100.930      70.00    0.19764

                              TOTAL FOR CYCLE:                             57.268     1208.58               1094.00
                              LBS POLLUTANT/1K LB FUEL/CYCLE:              47.384
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:             52.347
                              LBS POLLUTANT/1000K LB TH AT T.O.:            0.521


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      HC         FUEL     LB HC /     ENERGY   LB HC /
            POWER       # TH      RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   # TH-HR  # TH-HR
                                 LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.050      600.0   96.838    1174.927     1.000       19.00    30.665      372.06     82.420     190.00    0.16140
TAKEOFF     1.000    12000.0   0.0      10374.938     1.000        0.70    0.0         121.04     0.0        140.00    0.0
CLIMBOUT    0.850    10200.0   0.0       8646.199     1.000        2.20    0.0         317.03     0.0        374.00    0.0
APPROACH    0.400     4800.0    8.134    3920.626     1.000        4.00     0.542      261.38      2.075     320.00    0.00169
TAXI-IDLE   0.050      600.0   96.838    1174.937     1.000        7.00    11.298      137.08     82.420      70.00    0.16140

                              TOTAL FOR CYCLE:                             42.505     1208.58               1094.00
                              LBS POLLUTANT/1K LB FUEL/CYCLE:              35.170
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:             38.853
                              LBS POLLUTANT/1000K LB TH AT T.O.:            0.0


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     NOX         FUEL     LB NOX/     ENERGY   LB NOX/
            POWER       # TH      RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   # TH-HR  # TH-HR
                                 LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.050      600.0    2.806    1174.937     1.000       19.00     0.889      372.06      2.388     190.00    0.00468
TAKEOFF     1.000    12000.0  160.598   10374.938     1.000        0.70     1.874      121.04     15.479     140.00    0.01338
CLIMBOUT    0.850    10200.0  106.754    8646.199     1.000        2.20     3.914      317.03     12.347     374.00    0.01047
APPROACH    0.400     4800.0   26.170    3920.626     1.000        4.00     1.745      261.38      6.675     320.00    0.00545
TAXI-IDLE   0.050      600.0    2.806    1174.937     1.000        7.00     0.327      137.08      2.388      70.00    0.00468

                              TOTAL FOR CYCLE:                              8.749     1208.58               1094.00
                              LBS POLLUTANT/1K LB FUEL/CYCLE:               7.239
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:              7.997
                              LBS POLLUTANT/1000K LB TH AT T.O.:          156.136
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DATE:   7/22/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ***************************************************************************************************************

    CAL ID NUMBER:  407    ENGINE TYPE AND MODEL:  JT 3C - 7                   SERIAL NUMBER:    633042

                           RATED THRUST:         12000.

    ENGINE TOTAL TIME:                           13754. HRS

    TIME SINCE HOT SECTION OVERHAUL:             13754. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                     -0. HRS
         N2 COMPRESSOR OVERHAUL:                     -0. HRS
         COMBUSTOR CAN REPLACEMENT:                  -0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     -0. HRS
         N1 TURBINE OVERHAUL:                         0. HRS
         N2 TURBINE OVERHAUL:                        -0. HRS

    FUEL: JET - A              FUEL H/C RATIO:   1.920

 OPERATIONAL DATA ***********************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   57.20   FINISH   57.20

    ATMOSPHERIC PRESSURE:              START   29.96   FINISH   29.98

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0096

    RELATIVE HUMIDITY:                     94.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    5.00

    SAMPLE LINE TRANSPORT TIME, SEC:    5.00

 NUMBER OF TESTS:   4

 COMMENTS:

  EXHAUST GAS PRESSURE IN INCHES HG.
  ENGINE CARBO-BLASTED PRIOR TO EMISSIONS RUN.
  HIGH OIL CONSUMPTION.


  CLOCK      TEST          POWER                 ENGINE           MEASURED    GAS GEN       CALC      COMPRESSOR    ENGINE      TURBINE
  TIME       MODE     THRUST,LBS  PERCENT        SPEED              FUEL      AIR FLOW      F/A       DISCHARGE    PRESSURE      INLET
                          OR       RATED          RPM               FLOW      LB/SEC                    TEMP        RATIO        TEMP
                         SHP       T.O.       N1        N2          LB/HR                             DEGREES F      EPR       DEGREES F

  449.00     1/ 0     7809.00       65     5838.00   9228.00     6251.00      -0.00    -0.000000       -0.00         2.14        -0.00
  454.00     2/ 1     9113.00       75     6061.00   9419.00     7326.00      -0.00    -0.000000       -0.00         2.36        -0.00
  457.00     3/ 2    10861.00       90     6403.00   9708.00     8974.00      -0.00    -0.000000       -0.00         2.65        -0.00
  513.00     4/ 3      399.00        3     2251.00   5966.00     1182.00      -0.00    -0.000000       -0.00        -0.00        -0.00


  POWER     EXHAUST     EXHAUST         CO         CO        THC       NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
 PERCENT      GAS         GAS          (WET)        2       (WET)     (WET)       2         X
  RATED      TEMP      PRESSURE        PPMV      (WET)      PPMV      PPMV      (WET)     (WET)
  T.O.     DEGREES F     PSIA                   PERCENT V                       PPMV      PPMV

   65       872.60       62.50        60.00       2.15       3.60     36.00     -0.00     38.00     -0.00      -0.00      -0.00
   75       957.20       68.60        45.00       2.40       3.06     50.00     -0.00     52.00     -0.00      -0.00      -0.00
   90      1070.60       76.50        40.00       2.65       3.00     68.00     -0.00     72.00     -0.00      -0.00      -0.00
    3       527.00       31.50       590.00       0.90     219.00      8.40     -0.00      8.40     -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   65        5.59      0.19     -0.00   3146.58      5.51      5.81     34.94      1.20     -0.00  19669.28     34.43     36.34
   75        3.76      0.15     -0.00   3149.58      6.86      7.13     27.53      1.07     -0.00  23073.84     50.25     52.26
   90        3.03      0.13     -0.00   3150.78      8.45      8.95     27.16      1.17     -0.00  28275.07     75.85     80.31
    3      120.81     25.68     -0.00   2895.61      2.93      2.83    142.80     30.36     -0.00   3422.60      3.34      3.34


  POWER           CO                 CO               THC                NO                NO               NO
 PERCENT                              2                                                    2                X
  RATED      LB/1K#TH-HR        LB/1K#TH-HR       LB/1K#TH-HR        LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

   65           4.474            2518.796           0.154              4.405            -0.000            4.654
   75           3.021            2531.970           0.118              5.514            -0.000            5.735
   90           2.501            2603.358           0.107              6.984            -0.000            7.394
    3         357.994            8577.953          76.084              8.370            -0.000            8.370
    CAL ID NUMBER:  407   ENGINE TYPE AND MODEL: JT 3C - 7            SERIAL NUMBER:   633042

TEST ORGANIZATION:  UNITED/EPA


  MODE    FRACTIONAL   POWER   EMISSION     FUEL      USAGE     TIME IN     CO        FUEL     LB CO /     ENERGY    LB CO /
            POWER      # TH      RATE       RATE    WT FACTOR    MODE      MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                 LB/HR      LB/HR                MIN.      LBS.       LBS.

TAXI-IDLE   0.050      600.0   129.513   1280.095    1.000      19.00    41.013     405.36    101.175    190.00     0.21586
TAKEOFF     1.000    12000.0    13.406  10009.320    1.000       0.70     0.156     116.78      1.339    140.00     0.00112
CLIMBOUT    0.850    10200.0    23.547   8430.910    1.000       2.20     0.863     309.13      2.793    374.00     0.00231
APPROACH    0.400     4800.0    71.655   3888.995    1.000       4.00     4.777     259.27     18.425    320.00     0.01493
TAXI-IDLE   0.050      600.0   129.513   1280.095    1.000       7.00    15.110     149.34    101.175     70.00     0.21586

                                TOTAL FOR CYCLE:                         61.919    1239.88               1094.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:          49.940
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:         56.599
                                LBS POLLUTANT/1000K LB TH AT T.O.:        1.303


  MODE    FRACTIONAL   POWER   EMISSION     FUEL      USAGE     TIME IN     HC        FUEL     LB HC /     ENERGY    LB HC /
            POWER      # TH      RATE       RATE    WT FACTOR    MODE      MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                 LB/HR      LB/HR                MIN.      LBS.       LBS.

TAXI-IDLE   0.050      600.0    25.973   1280.095    1.000      19.00     8.225     405.36     20.290    190.00     0.04329
TAKEOFF     1.000    12000.0     0.361  10009.320    1.000       0.70     0.004     116.78      0.036    140.00     0.00003
CLIMBOUT    0.850    10200.0     0.601   8430.910    1.000       2.20     0.022     309.13      0.071    374.00     0.00006
APPROACH    0.400     4800.0     3.230   3888.995    1.000       4.00     0.215     259.27      0.831    320.00     0.00067
TAXI-IDLE   0.050      600.0    25.973   1280.095    1.000       7.00     3.030     149.34     20.290     70.00     0.04329

                                TOTAL FOR CYCLE:                         11.497    1239.88               1094.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:           9.272
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:         10.509
                                LBS POLLUTANT/1000K LB TH AT T.O.:        0.351


  MODE    FRACTIONAL   POWER   EMISSION     FUEL      USAGE     TIME IN    NOX        FUEL     LB NOX/     ENERGY    LB NOX/
            POWER      # TH      RATE       RATE    WT FACTOR    MODE      MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                 LB/HR      LB/HR                MIN.      LBS.       LBS.

TAXI-IDLE   0.050      600.0     3.710   1280.095    1.000      19.00     1.175     405.36      2.899    190.00     0.00618
TAKEOFF     1.000    12000.0   103.358  10009.320    1.000       0.70     1.206     116.78     10.326    140.00     0.00861
CLIMBOUT    0.850    10200.0    70.736   8430.910    1.000       2.20     2.594     309.13      8.390    374.00     0.00693
APPROACH    0.400     4800.0    17.638   3888.995    1.000       4.00     1.176     259.27      4.535    320.00     0.00367
TAXI-IDLE   0.050      600.0     3.710   1280.095    1.000       7.00     0.433     149.34      2.899     70.00     0.00618

                                TOTAL FOR CYCLE:                          6.583    1239.88               1094.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:           5.310
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:          6.018
                                LBS POLLUTANT/1000K LB TH AT T.O.:      100.487
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DATE:   7/22/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:  408    ENGINE TYPE AND MODEL:  JT 3C - 7                    SERIAL NUMBER:    632283

                            RATED THRUST:         12000.

     ENGINE TOTAL TIME:                           12765. HRS

     TIME SINCE HOT SECTION OVERHAUL:                 0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                 13838. HRS
          N2 COMPRESSOR OVERHAUL:                 15286. HRS
          COMBUSTOR CAN REPLACEMENT:                  0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     0. HRS
          N1 TURBINE OVERHAUL:                        0. HRS
          N2 TURBINE OVERHAUL:                        0. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   73.40   FINISH   68.00

     ATMOSPHERIC PRESSURE:              START   29.98   FINISH   29.98

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0

     RELATIVE HUMIDITY:                    0.0   PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    5.00

     SAMPLE LINE TRANSPORT TIME, SEC:    5.00

 NUMBER OF TESTS:   4

 COMMENTS:

  EXHAUST GAS PRESSURE IN INCHES HG.
  CARBO-BLAST(WALNUTS) PRIOR TO EMISSIONS RUN.
  PROBE SHIFTED 20 DEGREES FROM VERTICAL


  CLOCK      TEST          POWER                  ENGINE             MEASURED    GAS GEN       CALC       COMPRESSOR     ENGINE      TURBINE
  TIME       MODE    THRUST,LBS  PERCENT          SPEED                FUEL     AIR FLOW       F/A        DISCHARGE     PRESSURE      INLET
                         OR       RATED            RPM                 FLOW      LB/SEC                     TEMP         RATIO        TEMP
                         SHP      T.O.        N1          N2          LB/HR                              DEGREES F        EPR       DEGREES F

 1404.00     1/ 0     7802.00       65     5974.00     9281.00      6289.00      -0.00    -0.000000        -0.00         2.13         -0.00
 1407.00     2/ 1     9213.00       76     6118.00     9488.00      7441.00      -0.00    -0.000000        -0.00         2.37         -0.00
 1418.00     3/ 2    10743.00       89     6429.00     9783.00      8950.00      -0.00    -0.000000        -0.00         2.62         -0.00
 1457.00     4/ 3      411.00        3     2238.00     6027.00      1068.00      -0.00    -0.000000        -0.00        -0.00         -0.00


  POWER    EXHAUST       EXHAUST           CO         CO        THC       NO        NO         NO      ALDEHYDES    SMOKE    PARTICULATES
 PERCENT     GAS           GAS           (WET)         2       (WET)     (WET)       2          X
  RATED     TEMP        PRESSURE         PPMV       (WET)      PPMV      PPMV     (WET)      (WET)
  T.O.    DEGREES F       PSIA                     PERCENT V                        PPMV       PPMV

   65      470.80        62.40           60.00      2.30        1.38     54.00     -0.00      58.00     -0.00       -0.00       -0.00
   76      948.20        68.90           43.00      2.50        1.20     68.00     -0.00      73.00     -0.00       -0.00       -0.00
   89     1058.00        75.80           30.00      2.80        1.50     94.00     -0.00      10.00     -0.00       -0.00       -0.00
    3      512.60        31.60          610.00      1.20     1470.00     10.00     -0.00      10.00     -0.00       -0.00       -0.00


  POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
  RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   65        5.23       0.07      -0.00     3147.49      7.73       8.30      32.86       0.43      -0.00    19794.57     48.58      52.18
   76        3.21       0.06      -0.00     3150.70      8.96       9.62      23.87       0.41      -0.00    23444.34     66.66      71.57
   89        2.15       0.06      -0.00     3152.34     11.06       1.18      19.24       0.55      -0.00    28213.46     99.02      10.53
    3       87.02     120.19      -0.00     2689.68      2.34       2.34      92.94     128.27      -0.00     2872.58      2.50       2.50


  POWER          CO              CO              THC              NO              NO              NO
 PERCENT                           2                                                2               X
  RATED     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR
  T.O.

   65           4.212        2537.115           0.055           6.227          -0.000           6.688
   76           2.591        2544.202           0.045           7.236          -0.000           7.768
   89           1.791        2626.218           0.051           9.217          -0.000           0.981
    3         226.171        6989.238         312.085           6.089          -0.000           6.089
   CAL ID NUMBER:  408   ENGINE TYPE AND MODEL: JT 3C - 7               SERIAL NUMBER:   632283

TEST ORGANIZATION:  UNITED/EPA

  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      CO       FUEL     LB CO /    ENERGY   LB CO /
             POWER       # TH     RATE      RATE     WT FACTOR    MODE       MASS      MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.050       600.0    87.698   1138.526    1.000       19.00    27.771    360.53    77.028    190.00   0.14616
TAKEOFF     1.000     12000.0     3.953  10165.035    1.000        0.70     0.046    118.59     0.389    140.00   0.00033
CLIMBOUT    0.850     10200.0    17.296   8525.746    1.000        2.20     0.634    312.61     2.029    374.00   0.00170
APPROACH    0.400      4800.0    65.166   3883.257    1.000        4.00     4.344    258.[illegible]8    16.781    320.00   0.01358
TAXI-IDLE   0.050       600.0    87.698   1138.526    1.000        7.00    10.231    132.83    77.028     70.00   0.14616

                                TOTAL FOR CYCLE:                           43.027   1183.45              1094.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            36.3[illegible]
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           39.3[illegible]0
                                LBS POLLUTANT/1000K LB TH AT T.O.:          0.384


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      HC       FUEL     LB HC /    ENERGY   LB HC /
             POWER       # TH     RATE      RATE     WT FACTOR    MODE       MASS      MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.050       600.0   107.406   1138.526    1.000       19.00    34.012    360.53    94.337    190.00   0.17901
TAKEOFF     1.000     12000.0     0.0    10165.035    1.000        0.70     0.0      118.59     0.0      140.00   0.0
CLIMBOUT    0.850     10200.0     0.521   8525.746    1.000        2.20     0.019    312.61     0.061    374.00   0.00005
APPROACH    0.400      4800.0    12.884   3883.257    1.000        4.00     0.859    258.88     3.318    320.00   0.00268
TAXI-IDLE   0.050       600.0   107.406   1138.526    1.000        7.00    12.531    132.83    94.337     70.00   0.17901

                                TOTAL FOR CYCLE:                           47.420   1183.45              1094.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            40.070
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           43.346
                                LBS POLLUTANT/1000K LB TH AT T.O.:          0.0


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     NOX       FUEL     LB NOX/    ENERGY   LB NOX/
             POWER       # TH     RATE      RATE     WT FACTOR    MODE       MASS      MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.050       600.0     2.765   1138.526    1.000       19.00     0.876    360.53     2.429    190.00   0.00461
TAKEOFF     1.000     12000.0   123.292  10165.035    1.000        0.70     1.438    118.59    12.129    140.00   0.01027
CLIMBOUT    0.850     10200.0    89.981   8525.746    1.000        2.20     3.299    312.61    10.554    374.00   0.00882
APPROACH    0.400      4800.0    24.338   3883.257    1.000        4.00     1.623    258.88     6.267    320.00   0.00507
TAXI-IDLE   0.050       600.0     2.765   1138.526    1.000        7.00     0.323    132.83     2.429     70.00   0.00461

                                TOTAL FOR CYCLE:                            7.559   1183.45              1094.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             6.387
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:            6.909
                                LBS POLLUTANT/1000K LB TH AT T.O.:        119.867
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DATE: 6/29/71

TEST ORGANIZATION: PRATT & WHITNEY

ENGINE SUPPLIER: PRATT AND WHITNEY

ENGINE DATA **

CAL ID NUMBER: 62 ENGINE TYPE AND MODEL: JT3D SERIAL NUMBER: X-315-44

RATED THRUST: 21000.

ENGINE TOTAL TIME: -0. HRS

TIME SINCE HOT SECTION OVERHAUL: -0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: -0. HRS
N2 COMPRESSOR OVERHAUL: -0. HRS
COMBUSTOR CAN REPLACEMENT: -0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: -0. HRS
N1 TURBINE OVERHAUL: -0. HRS
N2 TURBINE OVERHAUL: -0. HRS

FUEL: JP-4C FUEL H/C RATIO: 2.000

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 68.90 FINISH 74.00

ATMOSPHERIC PRESSURE: START 30.19 FINISH 30.10

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0101

RELATIVE HUMIDITY: 60.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 2.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 11

COMMENTS:

BURNER = B/M

CLOCK TIME	TEST MODE	POWER THRUST, LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1102.00	1/ 0	756.00	3	1925.00	5450.00	1077.00	36.08	0.008360	195.00	1.02	763.00
1130.00	2/ 1	1777.00	8	2610.00	6861.00	1523.00	51.20	0.008330	283.00	1.05	861.00
1139.00	3/ 2	6778.00	32	4430.00	8545.00	3577.00	102.70	0.009770	485.00	1.20	1162.00
1148.00	4/ 3	14528.00	69	5880.00	9575.00	7789.00	161.91	0.013540	660.00	1.58	1548.00
1203.00	5/ 4	19855.00	94	6590.00	10095.00	11255.00	193.51	0.016420	754.00	1.91	1801.00
1220.00	6/ 5	20712.00	98	6730.00	10210.00	11905.00	19865.00	0.016920	779.00	1.98	1852.00
1517.00	7/ 6	19811.00	89	6450.00	10008.00	10421.00	185.54	0.015850	747.00	1.83	1761.00
1542.00	8/ 7	10325.00	49	5255.00	9150.00	5413.00	132.89	0.011440	589.00	1.37	1363.00
1553.00	9/ 8	2290.00	10	2855.00	7235.00	1692.00	59.20	0.008000	318.00	1.06	877.00
1602.00	10/ 9	1349.00	6	2235.00	6260.00	1263.00	45.17	0.007830	248.00	1.04	789.00
1703.00	11/10	847.00	4	1815.00	5433.00	1048.00	35.78	0.008210	200.00	1.02	762.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
3	594.00	15.17	859.60	1.44	1227.20	0.0	6.40	6.40	-0.00	-0.00	-0.00
8	592.00	15.51	493.50	1.51	333.10	7.20	8.60	15.80	-0.00	-0.00	-0.00
32	678.00	17.76	102.70	1.88	16.90	27.90	6.90	34.80	-0.00	-0.00	-0.00
69	876.00	23.18	18.20	2.60	11.60	80.50	2.90	83.40	-0.00	-0.00	-0.00
94	1033.00	28.02	11.60	3.42	1.20	144.20	11.00	155.20	-0.00	-0.00	-0.00
98	1070.00	29.00	10.50	3.46	1.00	161.40	8.90	170.30	-0.00	-0.00	-0.00
89	1006.00	26.78	11.90	3.05	1.30	0.0	15.50	15.50	-0.00	-0.00	-0.00
49	778.00	20.13	38.40	2.36	2.40	45.00	8.30	53.30	-0.00	-0.00	-0.00
10	608.00	15.73	386.50	1.60	194.20	3.60	11.10	14.70	-0.00	-0.00	-0.00
6	591.00	15.33	685.70	1.46	649.30	3.30	8.60	11.90	-0.00	-0.00	-0.00
4	597.	15.14	917.30	1.47	1236.80	4.70	4.20	8.90	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
3	104.12	85.13	1.27	2740.59	0.0	1.27	112.14	91.69	1.37	2951.61	0.0	1.37
8	61.94	23.92	1.77	2974.89	1.48	3.25	94.24	36.43	2.70	4530.76	2.26	4.96
32	10.77	1.02	1.20	3117.99	4.84	6.03	38.59	3.65	4.28	11153.05	17.30	21.58
69	1.4	0.51	0.37	3134.15	10.14	10.51	10.88	3.97	2.85	24411.91	79.01	81.86
94	0.64	0.04	1.05	3136.57	13.83	14.88	7.62	0.45	11.87	35302.11	155.60	167.47
98	0.61	0.03	0.84	3136.70	15.30	16.14	7.21	0.39	10.04	37342.43	182.10	192.14
89	0.76	0.05	1.67	3136.39	0.0	1.67	8.12	0.51	17.36	32684.30	0.0	17.36
49	3.24	0.12	1.15	3132.33	6.24	7.40	17.56	0.63	6.23	16955.30	33.80	40.03
10	46.55	13.40	2.20	3027.85	0.71	2.91	78.76	22.67	3.72	5123.13	1.21	4.92
6	85.93	46.60	1.77	2874.87	0.68	2.45	108.53	58.86	2.24	3630.96	0.86	3.09
4	108.69	83.93	0.82	2736.72	0.91	1.73	113.91	87.96	0.86	2868.08	0.96	1.82

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_x LB/1K#TH-HR
3	148.331	3904.250	121.282	0.0	1.814	1.814
8	53.034	2549.667	20.502	1.271	1.518	2.789
32	5.693	1645.478	0.539	2.553	0.631	3.184
69	0.743	1668.848	0.271	5.402	0.195	5.596
94	0.384	1777.996	0.023	7.837	0.598	8.435
98	0.348	1802.938	0.019	8.792	0.485	9.277
89	0.431	1737.511	0.027	0.0	0.923	0.923
49	1.701	1642.160	0.061	3.273	0.604	3.877
10	34.395	2237.173	9.898	0.526	1.622	2.149
6	80.455	2691.597	43.632	0.636	1.657	2.293
4	134.482	3386.160	103.848	1.132	1.011	2.143

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    CAL ID NUMBER:   62   ENGINE TYPE AND MODEL: JT3D                      SERIAL NUMBER:   X-315-44

TEST ORGANIZATION:  PRATT & WHITNEY

   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL     LB CO /     ENERGY    LB CO /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE    0.050      1050.0    69.488     693.896     1.000      19.00     22.005      219.73    100.142     332.50    0.06618
TAKEOFF      1.000     21000.0    28.644   12006.102     1.000       0.70      0.334      140.07      2.386     245.00    0.00136
CLIMBOUT     0.850     17850.0    15.853    9972.348     1.000       2.20      0.581      365.65      1.590     654.50    0.00089
APPROACH     0.400      8400.0    38.032    4482.105     1.000       4.00      2.535      298.81      8.485     560.00    0.00453
TAXI-IDLE    0.050      1050.0    69.488     693.896     1.000       7.00      8.107       80.95    100.142     122.50    0.06618

                                  TOTAL FOR CYCLE:                            33.562     1105.22               1914.50
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:             30.367
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:            17.531
                                  LBS POLLUTANT/1000K LB TH AT T.O.:           1.591


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL     LB HC /     ENERGY    LB HC /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE    0.050      1050.0    56.082     693.896     1.000      19.00     17.759      219.73     80.822     332.50    0.05341
TAKEOFF      1.000     21000.0    12.534   12006.102     1.000       0.70      0.146      140.07      1.044     245.00    0.00060
CLIMBOUT     0.850     17850.0    11.410    9972.348     1.000       2.20      0.418      365.65      1.144     654.50    0.00064
APPROACH     0.400      8400.0     4.679    4482.105     1.000       4.00      0.312      298.81      1.044     560.00    0.00056
TAXI-IDLE    0.050      1050.0    56.082     693.896     1.000       7.00      6.543       80.95     80.822     122.50    0.05341

                                  TOTAL FOR CYCLE:                            25.179     1105.22               1914.50
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:             22.782
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:            13.152
                                  LBS POLLUTANT/1000K LB TH AT T.O.:           6.964


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      NOX        FUEL     LB NOX/     ENERGY    LB NOX/
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE    0.050      1050.0     1.306     693.896     1.000      19.00      0.413      219.73      1.882     332.50    0.00124
TAKEOFF      1.000     21000.0   199.107   12006.102     1.000       0.70      2.323      140.07     16.584     245.00    0.00948
CLIMBOUT     0.850     17850.0   126.417    9972.348     1.000       2.20      4.635      365.65     12.677     654.50    0.00708
APPROACH     0.400      8400.0    26.752    4482.105     1.000       4.00      1.783      298.81      5.969     560.00    0.00318
TAXI-IDLE    0.050      1050.0     1.306     693.896     1.000       7.00      0.152       80.95      1.882     122.50    0.00124

                                  TOTAL FOR CYCLE:                             9.307     1105.22               1914.50
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:              8.421
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:             4.862
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         110.615
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DATE: 6/29/71

TEST ORGANIZATION: PRATT & WHITNEY

ENGINE SUPPLIER: PRATT AND WHITNEY

ENGINE DATA **

CAL ID NUMBER: 296 ENGINE TYPE AND MODEL: JT3D SERIAL NUMBER: X-315-44B

RATED THRUST: 21000.

ENGINE TOTAL TIME: -0. HRS

TIME SINCE HOT SECTION OVERHAUL: -0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: -0. HRS
N2 COMPRESSOR OVERHAUL: -0. HRS
COMBUSTOR CAN REPLACEMENT: -0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: -0. HRS
N1 TURBINE OVERHAUL: -0. HRS
N2 TURBINE OVERHAUL: -0. HRS

FUEL: JP-4C FUEL H/C RATIO: 2.000

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 74.00 FINISH 73.00

ATMOSPHERIC PRESSURE: START 30.10 FINISH 30.06

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0118

RELATIVE HUMIDITY: 62.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 2.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 9

COMMENTS:

BURNER = B/M

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1713.00	1/ 0	1890.00	8	2627.00	6902.00	1529.00	52.55	0.008150	292.20	1.05	859.00
1722.00	2/ 1	6406.00	30	4437.00	8582.00	3540.00	102.00	0.009730	493.70	1.20	1167.00
1731.00	3/ 2	14673.00	69	5925.00	9627.00	7907.00	159.91	0.013930	675.20	1.58	1583.00
1753.00	4/ 3	20079.00	95	6635.00	10152.00	11344.00	192.46	0.016650	771.50	1.92	1830.00
1800.00	5/ 4	20433.00	97	6675.00	10185.00	11540.00	194.49	0.016760	777.30	1.94	1841.00
1813.00	6/ 5	18878.00	89	6440.00	10017.00	10329.00	185.12	0.015740	753.00	1.83	1760.00
1830.00	7/ 6	10466.00	49	5277.00	9172.00	5484.00	133.22	0.011570	591.50	1.37	1373.00
1845.00	8/ 7	2355.00	11	2875.00	7265.00	1706.00	58.70	0.008140	319.30	1.06	888.00
1853.00	9/ 8	1303.00	6	2210.00	6225.00	1247.00	45.27	0.007710	244.80	1.04	780.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO2 (WET) PPMV	NOX (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
8	605.30	15.53	477.00	1.57	334.00	11.00	10.00	21.00	-0.00	-0.00	-0.00
30	690.80	17.73	97.00	1.95	29.40	12.00	13.00	25.00	-0.00	-0.00	-0.00
69	913.30	23.20	17.10	2.93	2.60	0.0	7.90	7.90	-0.00	-0.00	-0.00
95	1049.20	28.01	11.30	3.49	1.90	151.00	8.00	159.00	-0.00	-0.00	-0.00
97	1058.90	28.36	11.50	3.50	1.50	156.00	9.00	165.00	-0.00	-0.00	-0.00
89	1002.80	26.70	11.50	3.26	1.40	127.30	8.80	136.10	-0.00	-0.00	-0.00
49	779.80	20.15	36.60	2.32	1.50	48.70	8.60	57.30	-0.00	-0.00	-0.00
11	674.00	15.70	400.60	1.59	187.70	9.10	11.30	20.40	-0.00	-0.00	-0.00
6	585.30	15.31	686.40	1.40	649.80	9.20	5.00	14.20	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
8	57.69	23.14	1.99	2983.62	2.19	4.17	88.21	35.38	3.04	4561.95	3.34	6.38
30	9.87	1.71	2.17	3117.54	2.01	4.18	34.94	6.07	7.69	11036.08	7.10	14.79
69	1.16	0.10	0.88	3135.64	0.0	0.88	9.21	0.80	6.99	24793.46	0.0	6.99
95	0.65	0.06	0.75	3136.56	14.19	14.94	7.33	0.71	8.53	35581.11	160.94	169.46
97	0.66	0.05	0.84	3136.58	14.61	15.46	7.57	0.57	9.73	36196.13	168.66	178.39
89	0.71	0.05	0.89	3136.49	12.80	13.69	7.34	0.51	9.14	32396.84	132.25	141.39
49	3.15	0.07	1.21	3132.60	6.87	8.09	17.25	0.40	6.66	17179.17	37.70	44.36
11	48.52	13.02	2.25	3025.79	1.81	4.06	82.77	22.21	3.84	5162.00	3.09	6.92
6	89.38	48.46	1.07	2864.36	1.97	3.04	111.46	60.43	1.33	3571.86	2.45	3.79

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO2 LB/1K#TH-HR	NOX LB/1K#TH-HR
8	46.673	2413.732	18.717	1.768	1.607	3.375
30	5.454	1722.773	0.947	1.108	1.201	2.309
69	0.628	1639.734	0.055	0.0	0.476	0.476
95	0.365	1772.056	0.035	8.015	0.425	8.440
97	0.370	1771.456	0.028	8.254	0.476	8.730
89	0.389	1716.117	0.027	7.006	0.484	7.490
49	1.648	1641.427	0.039	3.602	0.636	4.238
11	35.148	2191.931	9.432	1.311	1.629	2.940
6	85.538	2741.260	46.378	1.883	1.023	2.907

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    CAL ID NUMBER:  296   ENGINE TYPE AND MODEL: JT3D                 SERIAL NUMBER:   X-315-448

TEST ORGANIZATION:  PRATT & WHITNEY


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     CO        FUEL     LB CO /    ENERGY   LB CO /
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050     1050.0  113.292    996.449     1.000      19.00    35.876     315.54   113.696    332.50    0.10790
TAKEOFF     1.000    21000.0   14.620  11832.008     1.000       0.70     0.171     138.04     1.236    245.00    0.00070
CLIMBOUT    0.850    17850.0    9.295   9850.836     1.000       2.20     0.341     361.20     0.944    654.50    0.00052
APPROACH    0.400     8400.0   28.414   4549.711     1.000       4.00     1.894     303.31     6.245    560.00    0.00338
TAXI-IDLE   0.050     1050.0  113.292    996.449     1.000       7.00    13.217     116.25   113.696    122.50    0.10790

                              TOTAL FOR CYCLE:                        51.499    1234.35              1914.50
                              LBS POLLUTANT/1K LB FUEL/CYCLE:         41.722
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:        26.899
                              LBS POLLUTANT/1000K LB TH AT T.O.:       0.812


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     HC        FUEL     LB HC /    ENERGY   LB HC /
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050     1050.0  105.495    996.449     1.000      19.00    33.407     315.54   105.871    332.50    0.10047
TAKEOFF     1.000    21000.0    3.504  11832.008     1.000       0.70     0.041     138.04     0.296    245.00    0.00017
CLIMBOUT    0.850    17850.0    1.783   9850.836     1.000       2.20     0.065     361.20     0.181    654.50    0.00010
APPROACH    0.400     8400.0    5.142   4549.711     1.000       4.00     0.343     303.31     1.130    560.00    0.00061
TAXI-IDLE   0.050     1050.0  105.495    996.449     1.000       7.00    12.308     116.25   105.871    122.50    0.10047

                              TOTAL FOR CYCLE:                        46.163    1234.35              1914.50
                              LBS POLLUTANT/1K LB FUEL/CYCLE:         37.399
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:        24.112
                              LBS POLLUTANT/1000K LB TH AT T.O.:       1.947


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN    NOX        FUEL     LB NOX/    ENERGY   LB NOX/
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050     1050.0    2.517    996.449     1.000      19.00     0.797     315.54     2.526    332.50    0.00240
TAKEOFF     1.000    21000.0  193.981  11832.008     1.000       0.70     2.263     138.04    16.395    245.00    0.00924
CLIMBOUT    0.850    17850.0  122.215   9850.836     1.000       2.20     4.481     361.20    12.407    654.50    0.00685
APPROACH    0.400     8400.0   27.197   4549.711     1.000       4.00     1.813     303.31     5.978    560.00    0.00324
TAXI-IDLE   0.050     1050.0    2.517    996.449     1.000       7.00     0.294     116.25     2.526    122.50    0.00240

                              TOTAL FOR CYCLE:                         9.648    1234.35              1914.50
                              LBS POLLUTANT/1K LB FUEL/CYCLE:          7.816
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:         5.040
                              LBS POLLUTANT/1000K LB TH AT T.O.:     107.767
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DATE:   6/29/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  297    ENGINE TYPE AND MODEL:  JT3D                          SERIAL NUMBER:    X-315-44C

                            RATED THRUST:        21000.

     ENGINE TOTAL TIME:                                      -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                        -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                            -0. HRS
          N2 COMPRESSOR OVERHAUL:                            -0. HRS
          COMBUSTOR CAN REPLACEMENT:                         -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:            -0. HRS
          N1 TURBINE OVERHAUL:                               -0. HRS
          N2 TURBINE OVERHAUL:                               -0. HRS

     FUEL: JP-5                  FUEL H/C RATIO:   1.970

OPERATIONAL DATA *******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   71.00   FINISH   68.00

     ATMOSPHERIC PRESSURE:              START   30.08   FINISH   30.09

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0130

     RELATIVE HUMIDITY:                        77.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:  10

COMMENTS:

 BURNER = B/M


  CLOCK       TEST            POWER                 ENGINE             MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE       TURBINE
  TIME        MODE      THRUST,LBS  PERCENT          SPEED               FUEL     AIR FLOW      F/A      DISCHARGE     PRESSURE      INLET
                           OR       RATED             RPM                FLOW      LB/SEC                  TEMP         RATIO        TEMP
                          SHP       T.O.        N1          N2          LB/HR                           DEGREES F       EPR       DEGREES F

 2055.00      1/ 0      857.00        4      1815.00     5445.00      1136.00      36.06    0.008830      195.00         1.02        797.00
 2110.00      2/ 1     1911.00        9      2617.00     6880.00      1604.00      50.95    0.008820      285.00         1.05        898.00
 2122.00      3/ 2     6487.00       30      4433.00     8557.00      3657.00     102.49    0.010010      486.00         1.20       1178.00
 2124.00      4/ 3    14613.00       69      5902.00     9580.00      8034.00     161.65    0.014000      666.00         1.58       1579.00
 2140.00      5/ 4    19723.00       93      6609.00    10108.00     11472.00     192.75    0.016810      761.00         1.92       1830.00
 2149.00      6/ 5    20314.00       96      6697.00    10179.00     11946.00     196.38    0.017190      774.00         1.96       1864.00
 2204.00      7/ 6    18735.00       89      6455.00    10000.00     10665.00     187.29    0.016070      739.00         1.84       1768.00
 2211.00      8/ 7    10480.00       49      5270.00     9138.00      5625.00     133.90    0.011800      584.00         1.37       1380.00
 2229.00      9/ 8     2371.00       11      2870.00     7240.00      1769.00      59.50    0.008330      312.00         1.06        893.00
 2234.00     10/ 9     1307.00        6      2200.00     6182.00      1314.00      45.40    0.008110      236.00         1.04        796.00


  POWER     EXHAUST      EXHAUST           CO          CO        THC        NO          NO          NO      ALDEHYDES    SMOKE    PARTICULATES
 PERCENT      GAS          GAS            (WET)         2        (WET)     (WET)         2           X
  RATED       TEMP       PRESSURE         PPMV        (WET)      PPMV      PPMV        (WET)       (WET)
  T.O.     DEGREES F       PSIA                     PERCENT V                          PPMV        PPMV

    4       583.00        15.10          980.60       1.39    1674.00      7.80        1.40        9.20      -0.00       -0.00       -0.00
    9       594.00        15.43          620.99       1.62     570.30      4.80        5.90       10.70      -0.00       -0.00       -0.00
   30       678.00        17.70          126.60       2.02      31.50     21.00        9.90       30.90      -0.00       -0.00       -0.00
   69       882.00        23.15           23.00       2.93       8.00     72.50        5.90       78.40      -0.00       -0.00       -0.00
   93      1038.00        27.90           12.30       3.63       5.40    136.30        5.30      141.60      -0.00       -0.00       -0.00
   96      1058.00        28.60           11.60       3.71       3.50    150.00        6.70      156.70      -0.00       -0.00       -0.00
   89      1000.00        26.90           13.40       3.36       3.10    118.70        6.40      125.10      -0.00       -0.00       -0.00
   49       767.00        20.10           51.80       2.37       5.10     41.90        7.90       49.80      -0.00       -0.00       -0.00
   11       596.00        15.70          483.30       1.69     313.30     10.50        4.90       15.40      -0.00       -0.00       -0.00
    6       575.00        15.30          866.70       1.51    1159.80      7.20        2.70        9.90      -0.00       -0.00       -0.00


  POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2         NO         NOX         CO         HC         NO2        CO2         NO         NOX
  RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    4      118.55     115.90       0.28    2640.29       1.55       1.83     135.67     131.67       0.32    2999.37       1.76       2.08
    9       71.45      37.59       1.12    2929.14       0.91       2.02     114.61      60.29       1.79    4698.34       1.46       3.24
   30       12.45       1.77       1.60    3120.10       3.39       4.99      45.51       6.47       5.85   11410.22      12.40      18.25
   69        1.57       0.31       0.66    3141.20       8.13       8.79      12.61       2.51       5.31   25236.41      65.28      70.59
   93        0.58       0.17       0.48    3142.99      12.34      12.82       7.78       1.96       5.50   36056.39     141.53     147.04
   96        0.63       0.11       0.59    3143.24      13.29      13.88       7.47       1.29       7.09   37549.19     158.71     165.80
   89        0.80       0.11       0.63    3142.98      11.61      12.23       8.51       1.13       6.67   33519.89     123.79     130.47
   49        4.36       0.25       1.09    3136.94       5.80       6.89      24.55       1.38       6.15   17645.58      32.61      38.76
   11       54.46      20.29       0.91    3002.98       1.95       2.86      96.69      35.90       1.61    5312.26       3.45       5.06
    6      101.28      77.62       0.52    2772.45       1.38       1.90     133.08     101.99       0.68    3642.99       1.82       2.50


  POWER          CO                  CO                 THC                 NO                  NO                  NO
 PERCENT                              2                                                          2                   X
  RATED     LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR
  T.O.

    4         157.140            3499.844            153.637              2.053               0.369               2.422
    9          59.973            2458.575             31.549              0.762               0.936               1.698
   30           7.016            1758.936              1.000              1.912               0.901               2.813
   69           0.863            1726.983              0.172              4.467               0.364               4.831
   93           0.394            1823.140              0.099              7.176               0.279               7.455
   96           0.368            1848.439              0.064              7.813               0.349               8.162
   89           0.454            1789.160              0.060              6.608               0.356               6.964
   49           2.342            1683.739              0.132              3.112               0.587               3.699
   11          40.779            2240.516             15.140              1.455               0.679               2.134
    6         101.921            2787.295             78.036              1.389               0.521               1.910
    CAL ID NUMBER:  297   ENGINE TYPE AND MODEL: JT3D                   SERIAL NUMBER:   X-315-44C

TEST ORGANIZATION:  PRATT & WHITNEY


  MODE     FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY    LB CO /
             POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE    0.050      1050.0   137.830   1184.024     1.000      19.00     43.646     374.94    116.408     332.50    0.13127
TAKEOFF      1.000     21000.0    20.928  12531.859     1.000       0.70      0.244     146.20      1.670     245.00    0.00100
CLIMBOUT     0.850     17850.0    12.097  10131.215     1.000       2.20      0.444     371.48      1.194     654.50    0.00068
APPROACH     0.400      8400.0    37.774   4782.535     1.000       4.00      2.518     318.84      7.898     560.00    0.00450
TAXI-IDLE    0.050      1050.0   137.830   1184.024     1.000       7.00     16.080     138.14    116.408     122.50    0.13127

                                 TOTAL FOR CYCLE:                            62.932    1349.59                1914.50
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             46.630
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            32.871
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           1.163


  MODE     FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY    LB HC /
             POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE    0.050      1050.0   123.160   1184.024     1.000      19.00     39.001     374.94    104.018     332.50    0.11730
TAKEOFF      1.000     21000.0     3.008  12531.859     1.000       0.70      0.035     146.20      0.240     245.00    0.00014
CLIMBOUT     0.850     17850.0     2.431  10131.215     1.000       2.20      0.089     371.48      0.240     654.50    0.00014
APPROACH     0.400      8400.0     4.155   4782.535     1.000       4.00      0.277     318.84      0.869     560.00    0.00049
TAXI-IDLE    0.050      1050.0   123.160   1184.024     1.000       7.00     14.369     138.14    104.018     122.50    0.11730

                                 TOTAL FOR CYCLE:                            53.771    1349.59                1914.50
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             39.842
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            28.086
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           1.671


  MODE     FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      NOX       FUEL     LB NOX/     ENERGY    LB NOX/
             POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE    0.050      1050.0     2.355   1184.024     1.000      19.00      0.746     374.94      1.989     332.50    0.00224
TAKEOFF      1.000     21000.0   189.466  12531.859     1.000       0.70      2.210     146.20     15.119     245.00    0.00902
CLIMBOUT     0.850     17850.0   114.911  10131.215     1.000       2.20      4.213     371.48     11.342     654.50    0.00644
APPROACH     0.400      8400.0    26.290   4782.535     1.000       4.00      1.753     318.84      5.497     560.00    0.00313
TAXI-IDLE    0.050      1050.0     2.355   1184.024     1.000       7.00      0.275     138.14      1.989     122.50    0.00224

                                 TOTAL FOR CYCLE:                             9.197    1349.59                1914.50
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              6.815
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             4.804
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         105.259
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DATE:   6/30/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  298    ENGINE TYPE AND MODEL:  JT3D                          SERIAL NUMBER:    X-315-44D

                            RATED THRUST:         21000.

     ENGINE TOTAL TIME:                                        -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                          -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                              -0. HRS
          N2 COMPRESSOR OVERHAUL:                              -0. HRS
          COMBUSTOR CAN REPLACEMENT:                           -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:              -0. HRS
          N1 TURBINE OVERHAUL:                                 -0. HRS
          N2 TURBINE OVERHAUL:                                 -0. HRS

     FUEL: JP-5                  FUEL H/C RATIO:   1.970

OPERATIONAL DATA *****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   81.00   FINISH   87.00

     ATMOSPHERIC PRESSURE:              START   30.00   FINISH   29.98

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0170

     RELATIVE HUMIDITY:                      73.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   4

COMMENTS:

 BURNER = B/M


 CLOCK      TEST          POWER               ENGINE           MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE       TURBINE
 TIME       MODE     THRUST,LBS  PERCENT       SPEED             FUEL     AIR FLOW      F/A     DISCHARGE     PRESSURE       INLET
                         OR       RATED         RPM              FLOW      LB/SEC                  TEMP         RATIO         TEMP
                        SHP       T.O.     N1          N2        LB/HR                          DEGREES F        EPR        DEGREES F

1030.00     1/ 0     9188.00        43   5124.00   9085.00     5083.00     123.91    0.011530     578.50         1.32        1359.00
1212.00     2/ 1    18606.00        88   6570.00  10145.00    11059.00     184.71    0.016910     773.70         1.85        1847.00
1321.00     3/ 2    16413.00        78   6289.00   9955.00     9444.00     171.72    0.015510     737.00         1.72        1733.00
1533.00     4/ 3     1748.00         8   1806.00   5440.00     1105.00      35.21    0.008800     217.70         1.02         816.00


 POWER    EXHAUST     EXHAUST        CO        CO       THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS         GAS        (WET)        2      (WET)     (WET)       2         X
 RATED     TEMP      PRESSURE       PPMV     (WET)      PPMV      PPMV     (WET)     (WET)
 T.O.   DEGREES F      PSIA               PERCENT V                        PPMV      PPMV

   43     769.40       19.40        63.50      2.27      5.40     37.40      6.00     43.40     -0.00     -0.00      -0.00
   88    1053.30       27.07        12.50      3.55      1.10    134.70      6.00    140.70     -0.00     -0.00      -0.00
   78     989.80       24.98        14.10      3.40      4.60      0.0       3.50      3.50     -0.00     -0.00      -0.00
    8     626.70       15.06       466.60      1.57   1650.00      9.30      2.10     11.40     -0.00     -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   43       5.58      0.27      0.87   3135.01      5.40      6.27     28.37      1.38      4.40  15935.25     27.45     31.85
   88       0.70      0.04      0.56   3143.32     12.47     13.02      7.79      0.39      6.14  34761.98    137.89    144.03
   78       0.83      0.15      0.34   3142.80      0.0       0.34      7.83      1.46      3.19  29680.56      0.0       3.19
    8      52.41    106.15      0.39   2770.96      1.72      2.10     57.92    117.30      0.43   3061.91      1.90      2.32


 POWER          CO                CO               THC               NO                NO                NO
PERCENT                            2                                                    2                 X
 RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

   43          3.088          1734.354             0.150             2.987             0.479             3.466
   88          0.419          1868.322             0.021             7.411             0.330             7.741
   78          0.477          1808.357             0.089             0.0               0.195             0.195
    8         33.133          1751.663            67.103             1.085             0.245             1.330
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     CAL ID NUMBER:  298   ENGINE TYPE AND MODEL: JT3D                SERIAL NUMBER:   X-315-440

TEST ORGANIZATION:  PRATT & WHITNEY


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN      CO        FUEL    LB CO /    ENERGY   LB CO /
             POWER      # TH      RATE       RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050      1050.0   46.640     690.219     1.000      19.00    14.769     218.57    67.573    332.50    0.04442
TAKEOFF     1.000     21000.0    4.155   12701.266     1.000       0.70     0.048     148.18     0.327    245.00    0.00020
CLIMBOUT    0.850     17850.0   11.552   10464.590     1.000       2.20     0.424     383.70     1.104    654.50    0.00065
APPROACH    0.400      8400.0   35.814    4727.398     1.000       4.00     2.388     315.16     7.576    560.00    0.00426
TAXI-IDLE   0.050      1050.0   46.640     690.219     1.000       7.00     5.441      80.53    67.573    122.50    0.04442

                                TOTAL FOR CYCLE:                           23.070    1146.14              1914.50
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            20.129
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           12.050
                                LBS POLLUTANT/1000K LB TH AT T.O.:          0.231


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN      HC        FUEL    LB HC /    ENERGY   LB HC /
             POWER      # TH      RATE       RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050      1050.0  108.854     690.219     1.000      19.00    34.470     218.57   157.709    332.50    0.10367
TAKEOFF     1.000     21000.0    2.794   12701.266     1.000       0.70     0.033     148.18     0.220    245.00    0.00013
CLIMBOUT    0.850     17850.0    2.302   10464.590     1.000       2.20     0.084     383.70     0.220    654.50    0.00013
APPROACH    0.400      8400.0    9.807    4727.398     1.000       4.00     0.654     315.16     2.074    560.00    0.00117
TAXI-IDLE   0.050      1050.0  108.854     690.219     1.000       7.00    12.700      80.53   157.709    122.50    0.10367

                                TOTAL FOR CYCLE:                           47.941    1146.14              1914.50
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            41.828
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           25.041
                                LBS POLLUTANT/1000K LB TH AT T.O.:          1.552


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN     NOX        FUEL    LB NOX/    ENERGY   LB NOX/
             POWER      # TH      RATE       RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050      1050.0    1.112     690.219     1.000      19.00     0.352     218.57     1.611    332.50    0.00106
TAKEOFF     1.000     21000.0  201.021   12701.266     1.000       0.70     2.345     148.18    15.827    245.00    0.00957
CLIMBOUT    0.850     17850.0  128.955   10464.590     1.000       2.20     4.728     383.70    12.323    654.50    0.00722
APPROACH    0.400      8400.0   27.518    4727.398     1.000       4.00     1.835     315.16     5.821    560.00    0.00328
TAXI-IDLE   0.050      1050.0    1.112     690.219     1.000       7.00     0.130      80.53     1.611    122.50    0.00106

                                TOTAL FOR CYCLE:                            9.390    1146.14              1914.50
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             8.193
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:            4.905
                                LBS POLLUTANT/1000K LB TH AT T.O.:        111.678
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DATE: 7/21/71

TEST ORGANIZATION: U.S. BUREAU OF MINES

ENGINE SUPPLIER: AMERICAN AIRLINES

ENGINE DATA **

CAL ID NUMBER: 292 ENGINE TYPE AND MODEL: JT3D-1 SERIAL NUMBER: 642590

RATED THRUST: 17000.

ENGINE TOTAL TIME: 21605. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	0. HRS
N2 COMPRESSOR OVERHAUL:	0. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	0. HRS
N1 TURBINE OVERHAUL:	0. HRS
N2 TURBINE OVERHAUL:	0. HRS

FUEL: JET - A FUEL H/C RATIO: 1.920

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 85.00 FINISH 85.00

ATMOSPHERIC PRESSURE: START 29.32 FINISH 29.32

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0080

RELATIVE HUMIDITY: 27.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 134.00, FLOW RATE, LITERS/MIN: 16.00

SAMPLE LINE TRANSPORT TIME, SEC: 0.99

NUMBER OF TESTS: 5

COMMENTS:

H/C IS CAL-ESTIMATED
USED SPEY PROBE LOCATED ONE PIPE D/A
DOWNSTREAM DUE TO LOCATION OF A.A.SUPPORT STAND.
SAMPLE LINE TEMP. AVERAGED

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
130.00	5/ 0	8400.00	49	5218.00	8947.00	4500.00	-0.00	-0.000000	-0.00	1.32	-0.00
135.00	4/ 5	930.00	5	1950.00	5592.00	900.00	-0.00	-0.000000	-0.00	1.04	-0.00
145.00	1/ 4	8750.00	51	5270.00	8980.00	4690.00	-0.00	-0.000000	-0.00	1.34	-0.00
150.00	2/ 1	11610.00	68	5876.00	9410.00	6390.00	-0.00	-0.000000	-0.00	1.50	-0.00
200.00	3/ 2	14360.00	84	6370.00	9750.00	8170.00	-0.00	-0.000000	-0.00	1.70	-0.00

9473

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO2 (WET) PPMV	NOX (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
49	740.00	18.44	55.00	2.33	5.80	36.70	22.00	58.70	0.92	-0.00	-0.00
5	570.00	14.92	700.00	1.39	1469.00	0.0	10.00	10.00	38.40	-0.00	-0.00
51	750.00	18.68	50.50	2.36	6.30	37.70	23.00	60.70	0.65	-0.00	-C.00
68	825.00	20.88	29.70	2.52	4.30	60.60	14.00	74.60	0.32	-0.00	-0.00
84	900.00	23.25	20.00	2.80	3.00	86.80	20.00	106.80	0.31	-0.00	-C.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
49	4.73	0.29	3.11	3147.68	5.18	8.29	21.28	1.29	13.98	14164.54	23.32	37.30
5	87.50	105.16	2.05	2729.91	0.0	2.05	78.75	94.65	1.85	2456.92	C.0	1.85
51	4.29	0.31	3.21	3148.31	5.26	8.47	20.11	1.44	15.04	14765.59	24.66	39.70
68	2.32	0.20	1.83	3151.70	7.92	9.75	14.85	1.25	11.70	20139.36	50.63	62.33
84	1.43	0.12	2.35	3153.30	10.22	12.57	11.71	1.01	19.24	25762.44	83.49	102.73

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO2 LB/1K#TH-HR	NOX LB/1K#TH-HR
49	2.533	1686.254	0.153	2.777	1.664	4.441
5	84.674	2641.845	101.770	0.0	1.987	1.987
51	2.298	1687.496	0.164	2.818	1.719	4.537
68	1.279	1734.657	0.108	4.361	1.007	5.368
84	0.816	1794.042	0.070	5.814	1.340	7.154

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    CAL ID NUMBER:  292   ENGINE TYPE AND MODEL: JT3D-1                    SERIAL NUMBER:  642590

TFST ORGANIZATION:  U.S. BUREAU OF MINES

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO          FUEL     LB CO /     ENERGY    LB CO /
             POWER       # TH      RATE       RATE     WT FACTOR    MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.         LBS.

TAXI-IDLE   0.050       850.0    70.546    846.397     1.000      19.00     22.340       268.03     83.349     269.17    0.08300
TAKEOFF     1.000     17000.0     4.088   9979.613     1.000       0.70      0.048       116.43      0.410     198.33    0.00024
CLIMBOUT    0.850     14450.0     8.920   8282.012     1.000       2.20      0.327       303.67      1.077     529.83    0.00062
APPROACH    0.400      6800.0    34.147   3797.192     1.000       4.00      2.276       253.15      8.993     453.33    0.00502
TAXI-IDLF   0.050       850.0    70.546    846.397     1.000       7.00      8.230        98.75     83.349      99.17    0.08300

                                 TOTAL FOR CYCLE:                           33.221      1040.02                1549.83
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            31.943
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           21.435
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          0.281


  MODE    FRACTIONAL    POWFR    FMISSION     FUEL       USAGF     TIME IN      HC          FUFL     LB HC /     ENERGY    LB HC /
             POWER       # TH      RATF       RATE     WT FACTOR    MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.         LBS.

TAXI-IDLF   0.050       850.0    87.958    846.397     1.000      19.00     27.853       268.03    103.921     269.17    0.10348
TAKEOFF     1.000     17000.0     1.108   9979.613     1.000       0.70      0.013       116.43      0.111     198.33    0.00007
CLIMBOUT    0.850     14450.0     1.546   8282.012     1.000       2.20      0.057       303.67      0.187     529.83    0.00011
APPROACH    0.400      6800.0    14.371   3797.192     1.000       4.00      0.958       253.15      3.785     453.33    0.00211
TAXI-IDLF   0.050       850.0    87.958    846.397     1.000       7.00     10.262        98.75    103.921      99.17    0.10348

                                 TOTAL FOR CYCLE:                           39.143      1040.02                1549.83
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            37.637
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           25.256
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          0.760


  MODE    FRACTIONAL    POWFR    EMISSION     FUEL       USAGE     TIME IN      NOX         FUFL     LB NOX/     ENERGY    LB NOX/
             POWER       # TH      RATE       RATF     WT FACTOR    MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.         LBS.

TAXI-IDLE   0.050       850.0     1.706    846.397     1.000      19.00      0.540       268.03      2.016     269.17    0.00201
TAKEOFF     1.000     17000.0   141.012   9979.613     1.000       0.70      1.645       116.43     14.130     198.33    0.00829
CLIMBOUT    0.850     14450.0   100.407   8282.012     1.000       2.20      3.682       303.67     12.124     529.83    0.00695
APPROACH    0.400      6800.0    27.717   3797.192     1.000       4.00      1.848       253.15      7.299     453.33    0.00408
TAXI-IDLF   0.050       850.0     1.706    846.397     1.000       7.00      0.199        98.75      2.016      99.17    0.00201

                                 TOTAL FOR CYCLE:                            7.914      1040.02                1549.83
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             7.609
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            5.106
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         96.773
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DATE:   7/19/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:  116    ENGINE TYPE AND MODEL:  JT3D -3B                 SERIAL NUMBER:   (TWA2304)

                         RATED THRUST:        18000.

     ENGINE TOTAL TIME:                               15372. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    74. HRS

     TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                      15372. HRS
         N2 COMPRESSOR OVERHAUL:                      15372. HRS
         COMBUSTOR CAN REPLACEMENT:                      74. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      15372. HRS
         N1 TURBINE OVERHAUL:                         15372. HRS
         N2 TURBINE OVERHAUL:                         15372. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA *******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   63.00   FINISH   64.00

     ATMOSPHERIC PRESSURE:              START   28.92   FINISH   28.95

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0107

     RELATIVE HUMIDITY:                      75.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:   5

 COMMENTS:

  F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
  DETERMINED BY SUBTRACTION.


 ELAPSED     TEST          POWER                  ENGINE             MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
  TIME       MODE     THRUST,LBS  PERCENT          SPEED                FUEL     AIR FLOW      F/A     DISCHARGE    PRESSURE      INLET
                          OR       RATED            RPM                 FLOW      LB/SEC                  TEMP        RATIO        TEMP
                         SHP       T.O.        N1          N2          LB/HR                           DEGREES F      EPR      DEGREES F

   0.0       1/ 0    11060.00       61      5785.00     9220.00      6170.00     139.80    0.012300      -0.00        1.50        -0.00
  10.00      2/ 1    13200.00       73      6180.00     7660.00      7590.00     154.20    0.013700      -0.00        1.65        -0.00
  25.00      3/ 2    15400.00       85      6510.00     9850.00      9190.00     171.50    0.014900      -0.00        1.82        -0.00
  33.00      4/ 3     1060.00        5      3710.00     6220.00      1070.00      38.60    0.007700      -0.00       -0.00        -0.00
  40.00      5/ 4    15400.00       85      6510.00     9820.00      9230.00     171.50    0.015000      -0.00       -0.00        -0.00


 POWER     EXHAUST      EXHAUST         CO         CO        THC        NO         NO         NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS          (WET)        2       (WET)     (WET)        2          X
 RATED      TEMP       PRESSURE        PPMV       (WET)      PPMV      PPMV      (WET)      (WET)
 T.O.     DEGREES F      PSIA                   PERCENT V                         PPMV       PPMV

   61      761.00        6.40         26.00       1.60      52.00     27.00      5.00      32.00     -0.00      -0.00       -0.00
   73      825.00        8.50         20.00       2.04      65.00     44.00      6.00      50.00     -0.00      -0.00       -0.00
   85      914.00       10.80         14.00       2.51      68.00     71.00      4.00      75.00     -0.00      -0.00       -0.00
    5      504.00        0.30        658.00       1.39    1060.00      0.0       7.00       7.00     -0.00      -0.00       -0.00
   85      917.00       10.60         11.00       2.44      70.00     70.00      5.00      75.00     -0.00      -0.00       -0.00


 POWER     MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2         NO         NOX
 RATED      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR       LB/HR      LB/HR
 T.O.      LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   61        3.22       3.69       1.02     3118.04       5.50       6.52      19.90      22.79       6.28    19238.31     33.94      40.22
   73        1.95       3.62       0.96     3120.24       7.04       7.99      14.78      27.51       7.28    23682.63     53.40      60.68
   85        1.11       3.04       0.52     3123.04       9.24       9.76      10.19      28.34       4.78    28700.71     84.87      89.65
    5       94.01      77.51       1.47     2788.58       0.0        1.47      89.90      82.94       1.57     2983.78      0.0        1.57
   85        0.90       3.27       0.67     3122.87       9.37      10.03       8.27      30.14       6.17    28824.11     86.45      92.62


 POWER           CO                 CO               THC                NO                 NO                NO
 PERCENT                             2                                                      2                 X
 RATED      LB/1K*TH-HR        LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR
 T.O.

   61          1.799             1739.449            2.061             3.069             0.568             3.637
   73          1.119             1794.139            2.084             4.045             0.552             4.597
   85          0.662             1863.682            1.540             5.511             0.310             5.822
    5         94.407             2814.889           78.746             0.0               1.482             1.482
   85          0.537             1871.696            1.957             5.613             0.401             6.014
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    CAL ID NUMBER:  116   ENGINE TYPE AND MODEL: JT3D -3B               SERIAL NUMBER:  (TWA2304)

TEST ORGANIZATION:  S W R I TWA


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN      CO        FUEL     LB CO /     ENERGY   LB CO /
             POWER      # TH      RATE       RATE     WT FACTOR   MODE       MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.050       900.0  292.230     991.115     1.000      19.00    92.539     313.85    294.850    285.00     0.32470
TAKEOFF     1.000     18000.0    0.0     11218.996     1.000       0.70    0.0        130.89      0.0      210.00    0.0
CLIMBOUT    0.850     15300.0    6.702    9176.582     1.000       2.20    0.246      336.47      0.730    561.00    0.00044
APPROACH    0.400      7200.0   17.412    4395.953     1.000       4.00    1.161      293.06      3.961    480.00    0.00242
TAXI-IDLE   0.050       900.0  292.230     991.115     1.000       7.00   34.093      115.63    294.850    105.00    0.32470

                                 TOTAL FOR CYCLE:                        128.039    1189.91                1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:         107.604
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:         78.025
                                 LBS POLLUTANT/1000K LB TH AT T.O.:       0.0


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN      HC        FUEL     LB HC /     ENERGY   LB HC /
             POWER      # TH      RATE       RATE     WT FACTOR   MODE       MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.050       900.0  214.801     991.115     1.000      19.00   68.020      313.85    216.726    285.00     0.23867
TAKEOFF     1.000     18000.0   27.784   11218.996     1.000       0.70    0.324      130.89      2.477    210.00     0.00154
CLIMBOUT    0.850     15300.0   27.207    9176.582     1.000       2.20    0.998      336.47      2.965    561.00     0.00178
APPROACH    0.400      7200.0   19.179    4395.953     1.000       4.00    1.279      293.06      4.363    480.00     0.00266
TAXI-IDLE   0.050       900.0  214.801     991.115     1.000       7.00   25.060      115.63    216.726    105.00     0.23867

                                 TOTAL FOR CYCLE:                         95.681    1189.91                1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:          80.410
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:         58.306
                                 LBS POLLUTANT/1000K LB TH AT T.O.:       18.008


  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN      NOX       FUEL     LB NOX/     ENERGY   LB NOX/
             POWER      # TH      RATE       RATE     WT FACTOR   MODE       MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                               .  LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.050       900.0    1.133     991.115     1.000      19.00    0.359      313.85      1.144    285.00     0.00126
TAKEOFF     1.000     18000.0  146.115   11218.996     1.000       0.70    1.705      130.89     13.024    210.00     0.00812
CLIMBOUT    0.850     15300.0   89.862    9176.582     1.000       2.20    3.295      336.47      9.793    561.00     0.00587
APPROACH    0.400      7200.0   19.761    4395.953     1.000       4.00    1.317      293.06      4.495    480.00     0.00274
TAXI-IDLE   0.050       900.0    1.133     991.115     1.000       7.00    0.132      115.63      1.144    105.00     0.00126

                                 TOTAL FOR CYCLE:                         6.808     1189.91                1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:          5.722
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:         4.149
                                 LBS POLLUTANT/1000K LB TH AT T.O.:       94.704
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DATE:   7/19/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ************************************************************************************************************

     CAL ID NUMBER:  117    ENGINE TYPE AND MODEL:  JT3D -3B                SERIAL NUMBER:   (TWA3102)

                         RATED THRUST:          18000.

     ENGINE TOTAL TIME:                                 9463. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   9463. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       9463. HRS
          N2 COMPRESSOR OVERHAUL:                       9463. HRS
          COMBUSTOR CAN REPLACEMENT:                    9463. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       9463. HRS
          N1 TURBINE OVERHAUL:                          9463. HRS
          N2 TURBINE OVERHAUL:                          9463. HRS

     FUEL: JP-4 TF                 FUEL H/C RATIO:   2.020

OPERATIONAL DATA *********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   75.00   FINISH   75.00

     ATMOSPHERIC PRESSURE:              START   28.97   FINISH   28.96

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0101

     RELATIVE HUMIDITY:                       46.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   6

COMMENTS:

 F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
 DETERMINED BY SUBTRACTION.


 ELAPSED    TEST          POWER               ENGINE            MEASURED    GAS GEN     CALC     COMPRESSOR     ENGINE       TURBINE
  TIME      MODE    THRUST,LBS  PERCENT        SPEED              FUEL     AIR FLOW     F/A     DISCHARGE     PRESSURE       INLET
                        OR       RATED          RPM               FLOW      LB/SEC                 TEMP         RATIO         TEMP
                       SHP       T.O.        N1         N2        LB/HR                        DEGREES F       EPR       DEGREES F

    0.0     6/ 0     9120.00      50     5360.00    9110.00     5130.00     126.00    0.011400      -0.00        1.37         -0.00
    4.30    1/ 6    11200.00      62     5920.00    9420.00     6350.00     142.30    0.012400      -0.00        1.50         -0.00
    7.30    2/ 1    13320.00      73     6180.00    9630.00     7770.00     158.80    0.013600      -0.00        1.65         -0.00
   22.30    3/ 2    15500.00      86     6590.00    9970.00     9350.00     173.40    0.015000      -0.00        1.94         -0.00
   27.30    4/ 3      880.00       4     1900.00    5700.00      980.00      34.90    0.007800      -0.00       -0.00         -0.00
   32.30    5/ 4    14140.00      78     6320.00    9740.00     8500.00     164.30    0.014400      -0.00       -0.00         -0.00


 POWER     EXHAUST     EXHAUST        CO         CO        THC       NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
PERCENT      GAS         GAS        (WET)        2        (WET)     (WET)       2         X
 RATED      TEMP      PRESSURE      PPMV       (WET)      PPMV      PPMV      (WET)     (WET)
 T.O.    DEGREES F      PSIA                 PERCENT V                        PPMV      PPMV

   50      759.00       4.70        22.00      1.45      72.00     22.00      4.00     26.00     -0.00       -0.00       -0.00
   62      820.00       6.40        37.00      1.75      76.00      3.70      3.00     40.00     -0.00       -0.00       -0.00
   73      889.00       8.50        13.00      2.06      77.00     58.00      3.00     61.00     -0.00       -0.00       -0.00
   86      979.00       0.83        10.00      2.58      93.00     93.00      4.00     97.00     -0.00       -0.00       -0.00
    4      575.00       0.20       642.00      1.38    1340.00      1.00      6.00      7.00     -0.00       -0.00       -0.00
   78      923.00       0.30        13.00      2.51      80.00     75.00      3.00     78.00     -0.00       -0.00       -0.00


 POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2         NO        NOX
 RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
 T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   50       3.01       5.63       0.90    3113.06       4.94       5.84      15.42      28.91       4.61   15970.01      25.33      29.96
   62       4.12       4.85       0.55    3113.48       0.68       7.31      26.16      30.77       3.48   19770.57       4.30      46.45
   73       1.24       4.21       0.47    3119.74       9.09       9.56       9.64      32.71       3.65   24240.39      70.66      74.32
   86       0.77       4.10       0.51    3120.78      11.76      12.27       7.20      38.34       4.73   29179.32     109.96     114.69
    4      86.94      99.30       1.24    2724.22       0.21       1.44      85.20      97.31       1.21    2669.73       0.20       1.42
   78       1.03       3.63       0.39    3121.67       9.75      10.14       8.75      30.83       3.32   26534.23      82.89      86.20


 POWER          CO                 CO                THC                NO                NO                NO
PERCENT                             2                                                      2                 X
 RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

   50          1.691           1751.047             3.169             2.777             0.505             3.282
   62          2.335           1765.230             2.747             0.384             0.311             4.147
   73          0.724           1819.850             2.456             5.305             0.274             5.579
   86          0.464           1882.537             2.474             7.094             0.305             7.399
    4         96.322           3033.786           110.584             0.230             1.379             1.509
   78          0.619           1875.537             2.180             5.862             0.234             6.096
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CAL ID NUMBER:  117   ENGINE TYPE AND MODEL: JT3D -3B              SERIAL NUMBER:  (TWA3102)

TEST ORGANIZATION:  S W R I TWA


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     CO         FUEL     LB CO /    ENERGY   LB CO /
            POWER       # TH      RATE      RATE     WT FACTOR   MODE      MASS        MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                 MIN.      LBS.        LBS.

TAXI-IDLE   0.050       900.0  113.893    878.435    1.000      19.00    36.066      278.17   129.654    285.00    0.12655
TAKEOFF     1.000     18000.0    3.828  11033.723    1.000       0.70     0.045      128.73     0.347    210.00    0.00021
CLIMBOUT    0.850     15300.0    2.428   9180.453    1.000       2.20     0.089      336.62     0.264    561.00    0.00016
APPROACH    0.400      7200.0   10.974   4160.602    1.000       4.00     0.732      277.37     2.638    480.00    0.00152
TAXI-IDLE   0.050       900.0  113.893    878.435    1.000       7.00    13.287      102.[illegible]  129.654    105.00    0.12655

                               TOTAL FOR CYCLE:                         50.219     112[illegible]                1641.00
                               LBS POLLUTANT/1K LB FUEL/CYCLE:          44.704
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:         30.603
                               LBS POLLUTANT/1000K LB TH AT T.O.:        0.248


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     HC         FUEL     LB HC /    ENERGY   LB HC /
            POWER       # TH      RATE      RATE     WT FACTOR   MODE      MASS        MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                 MIN.      LBS.        LBS.

TAXI-IDLE   0.050       900.0   98.843    878.435    1.000      19.00    31.300      278.17   112.521    285.00    0.10983
TAKEOFF     1.000     18000.0   36.046  11033.723    1.000       0.70     0.421      128.73     3.267    210.00    0.00200
CLIMBOUT    0.850     15300.0   34.569   9180.453    1.000       2.20     1.268      336.62     3.765    561.00    0.00226
APPROACH    0.400      7200.0   24.183   4160.602    1.000       4.00     1.612      277.37     5.812    480.00    0.00336
TAXI-IDLE   0.050       900.0   98.843    878.435    1.000       7.00    11.532      102.48   112.521    105.00    0.10983

                               TOTAL FOR CYCLE:                         46.132     1123.37               1641.00
                               LBS POLLUTANT/1K LB FUEL/CYCLE:          41.066
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:         28.112
                               LBS POLLUTANT/1000K LB TH AT T.O.:       23.363


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     NOX        FUEL     LB NOX/    ENERGY   LB NOX/
            POWER       # TH      RATE      RATE     WT FACTOR   MODE      MASS        MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                 MIN.      LBS.        LBS.

TAXI-IDLE   0.050       900.0    1.299    878.435    1.000      19.00     0.411      278.17     1.478    285.00    0.00144
TAKEOFF     1.000     18000.0  174.746  11033.723    1.000       0.70     2.039      128.73    15.837    210.00    0.00971
CLIMBOUT    0.850     15300.0  108.525   9180.453    1.000       2.20     3.979      336.62    11.821    561.00    0.00709
APPROACH    0.400      7200.0   19.580   4160.602    1.000       4.00     1.305      277.37     4.706    480.00    0.00272
TAXI-IDLE   0.050       900.0    1.299    878.435    1.000       7.00     0.152      102.48     1.478    105.00    0.00144

                               TOTAL FOR CYCLE:                          7.886     1123.37               1641.00
                               LBS POLLUTANT/1K LB FUEL/CYCLE:           7.020
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:          4.806
                               LBS POLLUTANT/1000K LB TH AT T.O.:      113.261
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DATE:   7/ 1/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:  124    ENGINE TYPE AND MODEL:  JT3D -3B                   SERIAL NUMBER:    645735

                             RATED THRUST:        18000.

     ENGINE TOTAL TIME:                               12462. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  6682. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                     12462. HRS
          N2 COMPRESSOR OVERHAUL:                     16576. HRS
          COMBUSTOR CAN REPLACEMENT:                   3993. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      3993. HRS
          N1 TURBINE OVERHAUL:                         6682. HRS
          N2 TURBINE OVERHAUL:                         3993. HRS

     FUEL: JET - A               FUEL H/C RATIO:   1.920

OPERATIONAL DATA *****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    55.40   FINISH   55.40

     ATMOSPHERIC PRESSURE:              START    29.88   FINISH   29.96

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0065

     RELATIVE HUMIDITY:                    69.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    1.50

     SAMPLE LINE TRANSPORT TIME, SEC:    5.00

 NUMBER OF TESTS:   4

 COMMENTS:

  EXHAUST GAS PRESSURE IN INCHES HG.
  PRE-REPAIR RUN


  CLOCK      TEST          POWER                  ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
  TIME       MODE     THRUST,LBS  PERCENT         SPEED               FUEL      AIR FLOW     F/A      DISCHARGE    PRESSURE      INLET
                          OR       RATED           RPM                FLOW      LB/SEC                  TEMP        RATIO        TEMP
                         SHP       T.O.       N1          N2         LB/HR                            DEGREES F      EPR       DEGREES F

  120.00     1/ 0     9300.00       51     5165.00    8892.00     4528.00      -0.00   -0.000000      -0.00        1.38         -0.00
  130.00     2/ 1    13200.00       73     5946.00    9334.00     7023.00      -0.00   -0.000000      -0.00        1.60         -0.00
  135.00     3/ 2    16500.00       91     6403.00    9722.00     9277.00      -0.00   -0.000000      -0.00        1.84         -0.00
  145.00     4/ 3     1125.00        6     2103.00    5850.00       -0.00      -0.00   -0.000000      -0.00       -0.00         -0.00


  POWER     EXHAUST      EXHAUST         CO         CO        THC       NO        NO         NO    ALDEHYDES   SMOKE   PARTICULATES
 PERCENT      GAS          GAS          (WET)        2       (WET)     (WET)       2          X
  RATED      TEMP        PRESSURE       PPMV      (WET)      PPMV      PPMV     (WET)      (WET)
  T.O.    DEGREES F        PSIA                 PERCENT V                       PPMV       PPMV

   51       698.00        40.80         95.00      2.18       9.30     36.00    -0.00      42.00     -0.00      -0.00      -0.00
   73       800.60        47.20         60.00      2.50       0.90     60.00    -0.00      64.00     -0.00      -0.00      -0.00
   91       912.20        54.30         30.00      2.85       0.45     94.00    -0.00      94.00     -0.00      -0.00      -0.00
    6       536.00        31.10        865.00      1.45    1920.00     10.80    -0.00      11.40     -0.00      -0.00      -0.00


  POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
  RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K     LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   51        9.71       0.49      -0.00     3140.86       5.42       6.33      42.93       2.41      -0.00   15478.17      26.72      31.17
   73        4.81       0.04      -0.00     3148.27       7.90       8.43      33.77       0.29      -0.00   22109.94      55.47      59.17
   91        2.11       0.02      -0.00     3152.52      10.87      10.87      19.57       0.17      -0.00   29245.94     100.84     100.84
    6      100.51     127.78      -0.00     2647.41       2.06       2.18      -0.00      -0.00       0.00      -0.00      -0.00      -0.00


  POWER           CO                 CO                THC                NO                 NO                NO
 PERCENT                              2                                                       2                 X
  RATED      LB/1K*TH-HR        LB/1K*TH-HR        LB/1K*TH-HR        LB/1K*TH-HR        LB/1K*TH-HR       LB/1K*TH-HR
  T.O.

   51           4.616           1664.320             0.259              2.873             -0.000             3.352
   73           2.559           1674.996             0.022              4.202             -0.000             4.483
   91           1.187           1772.493             0.010              6.111             -0.000             6.111
    6          -0.000             -0.000            -0.000             -0.000              0.000            -0.000
    CAL ID NUMBER:  124   ENGINE TYPE AND MODEL: JT3D -3B                 SERIAL NUMBER:    645735

  TEST ORGANIZATION:  UNITED/EPA

      MODE   FRACTIONAL    POWER   EMISSION     FUEL      USAGE    TIME IN      CO         FUEL     LB CO /      ENERGY   LB CO /
                POWER       # TH      RATE      RATE    WT FACTOR    MODE      MASS        MASS   1K LB FUEL   # TH-HR  # TH-HR
                                     LB/HR     LB/HR                 MIN.      LBS.        LBS.

  TAXI-IDLE    0.050       900.0  161.292    714.560     1.000      19.00    51.076      226.28    225.722     285.00     0.17921
  TAKEOFF      1.000     18000.0   18.161  10271.152     1.000       0.70     0.212      119.83      1.768     210.00     0.00101
  CLIMBOUT     0.850     15300.0   30.252   8538.969     1.000       2.20     1.109      313.10      3.543     561.00     0.00198
  APPROACH     0.400      7200.0   49.445   3992.905     1.000       4.00     3.296      266.19     12.383     480.00     0.00687
  TAXI-IDLE    0.050       900.0  161.292    714.560     1.000       7.00    18.817       83.37    225.722     105.00     0.17921

                                  TOTAL FOR CYCLE:                          74.511    1008.76                1641.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:           73.863
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:          45.406
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         1.177


      MODE   FRACTIONAL    POWER   EMISSION     FUEL      USAGE    TIME IN      HC         FUEL     LB HC /      ENERGY   LB HC /
                POWER       # TH      RATE      RATE    WT FACTOR    MODE      MASS        MASS   1K LB FUEL   # TH-HR  # TH-HR
                                     LB/HR     LB/HR                 MIN.      LBS.        LBS.

  TAXI-IDLE    0.050       900.0  165.350    714.56C     1.000      19.00    52.361      226.28    231.401     285.00     0.18372
  TAKEOFF      1.000     18000.0    0.0    10271.152     1.000       0.70    0.0         119.83      0.0       210.00    0.0
  CLIMBOUT     0.850     15300.0    2.242   8538.969     1.000       2.20     0.082      313.10      0.263     561.00     0.00015
  APPROACH     0.400      7200.0    5.495   3992.905     1.000       4.00     0.366      266.19      1.376     480.00     0.00076
  TAXI-IDLE    0.050       900.0  165.350    714.560     1.000       7.00    19.291       83.37    231.401     105.00     0.18372

                                  TOTAL FOR CYCLE:                          72.100    1008.76                1641.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:           71.474
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:          43.937
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         0.0


      MODE   FRACTIONAL    POWER   EMISSION     FUEL      USAGE    TIME IN     NOX         FUEL     LB NOX/      ENERGY   LB NOX/
                POWER       # TH      RATE      RATE    WT FACTOR    MODE      MASS        MASS   1K LB FUEL   # TH-HR  # TH-HR
                                     LB/HR     LB/HR                 MIN.      LBS.        LBS.

  TAXI-IDLE    0.050       900.0    1.221    714.560     1.000      19.00     0.387      226.28      1.709     285.00     0.00136
  TAKEOFF      1.000     18000.0  123.605  10271.152     1.000       0.70     1.442      119.83     12.034     210.00     0.00687
  CLIMBOUT     0.850     15300.0   85.236   8538.969     1.000       2.20     3.125      313.10      9.982     561.00     0.00557
  APPROACH     0.400      7200.0   21.435   3992.905     1.000       4.00     1.429      266.19      5.368     480.00     0.00298
  TAXI-IDLE    0.050       900.0    1.221    714.560     1.000       7.00     0.142       83.37      1.709     105.00     0.00136

                                  TOTAL FOR CYCLE:                           6.526    1008.76                1641.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            6.469
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           3.977
                                  LBS POLLUTANT/1000K LB TH AT T.O.:        80.114
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DATE:   7/ 1/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  125    ENGINE TYPE AND MODEL:  JT3D -3B                     SERIAL NUMBER:    644691

                                RATED THRUST:         18000.

     ENGINE TOTAL TIME:                                12024. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   7510. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      15996. HRS
          N2 COMPRESSOR OVERHAUL:                      13660. HRS
          COMBUSTOR CAN REPLACEMENT:                       0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       3032. HRS
          N1 TURBINE OVERHAUL:                          7510. HRS
          N2 TURBINE OVERHAUL:                             0. HRS

     FUEL: JET - A               FUEL H/C RATIO:   1.920

OPERATIONAL DATA ************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   62.60   FINISH   61.52

     ATMOSPHERIC PRESSURE:              START   29.93   FINISH   30.30

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0085

     RELATIVE HUMIDITY:                        69.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    1.50

     SAMPLE LINE TRANSPORT TIME, SEC:    5.00

 NUMBER OF TESTS:   4

 COMMENTS:

  EXHAUST GAS PRESSURE IN INCHES HG.


  CLOCK      TEST          POWER                ENGINE           MEASURED   GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
  TIME       MODE    THRUST,LBS  PERCENT        SPEED              FUEL     AIR FLOW     F/A      DISCHARGE    PRESSURE      INLET
                         OR        RATED         RPM               FLOW     LB/SEC                  TEMP        RATIO        TEMP
                        SHP        T.O.       N1        N2         LB/HR                          DEGREES F      EPR       DEGREES F

 1611.00     1/ 0     9369.00       52     5230.00   9008.00     5036.00    -0.00    -0.000000     -0.00        1.38         -0.00
 1616.00     2/ 1    13389.00       74     5924.00   9484.00     7281.00    -0.00    -0.000000     -0.00        1.61         -0.00
 1622.00     3/ 2    16492.00       91     6443.00   9848.00     9425.00    -0.00    -0.000000     -0.00        1.83         -0.00
 1702.00     4/ 3      985.00        5     2023.00   5812.00     1187.00    -0.00    -0.000000     -0.00        0.0          -0.00


  POWER    EXHAUST     EXHAUST        CO         CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS         (WET)        2        (WET)     (WET)      2         X
  RATED     TEMP       PRESSURE      PPMV       (WET)      PPMV      PPMV     (WET)     (WET)
  T.O.    DEGREES F      PSIA                 PERCENT V                       PPMV      PPMV

   52      707.00       40.90         8.50       2.50      5.85     40.00    -0.00     47.00     -0.00      -0.00      -0.00
   74      811.40       47.70        45.00       2.62      0.45     71.00    -0.00     72.00     -0.00      -0.00      -0.00
   91      921.20       54.20        30.00       3.00      0.42    104.00    -0.00    104.00     -0.00      -0.00      -0.00
    5      525.20       30.80       840.00       1.38   1945.00      9.50    -0.00     10.50     -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   52        0.68      0.27     -0.00   3154.08      5.28      6.20      3.44      1.35     -0.00  15883.93     26.57     31.22
   74        3.44      0.02     -0.00   3150.42      8.93      9.05     25.07      0.14     -0.00  22938.23     64.98     65.90
   91        2.01      0.02     -0.00   3152.69     11.43     11.43     18.91      0.15     -0.00  29714.11    107.69    107.69
    5      102.35    128.75     -0.00   2641.87      1.90      2.10    121.49    152.82     -0.00   3135.90      2.26      2.49


  POWER         CO                CO               THC               NO               NO               NO
 PERCENT                           2                                                   2                X
  RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

   52          0.367          1695.371           0.145            2.836           -0.000            4.332
   74          1.473          1713.215           0.011            4.853           -0.000            4.922
   91          1.147          1801.730           0.009            6.530           -0.000            6.530
    5        123.336          3183.657         155.150            2.291           -0.000            2.532
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     CAL ID NUMBER:  125   ENGINE TYPE AND MODEL: JT3D -3B                SERIAL NUMBER:   644691

TEST ORGANIZATION:  UNITED/EPA

  MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     CO       FUEL     LB CO /    ENERGY    LB CO /
            POWER       # TH      RATE      RATE    WT FACTOR    MODE     MASS      MASS    1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR     LB/HR                 MIN.     LBS.      LBS.

TAXI-IDLE   0.050       900.0  129.777    663.377    1.000      19.00    41.096    210.07    195.631    285.00    0.14420
TAKEOFF     1.000     18000.0    7.140  10008.262    1.000       0.70     0.083    116.76      0.713    210.00    0.00040
CLIMBOUT    0.850     15300.0   21.271   8568.125    1.000       2.20     0.780    314.16      2.483    561.00    0.00139
APPROACH    0.400      7200.0    3.985   3870.219    1.000       4.00     0.266    258.01      1.030    480.00    0.00055
TAXI-IDLE   0.050       900.0  129.777    663.377    1.000       7.00    15.141     77.39    195.631    105.00    0.14420

                         TOTAL FOR CYCLE:                                57.366    976.41               1641.00
                         LBS POLLUTANT/1K LB FUEL/CYCLE:                 58.752
                         LBS POLLUTANT/1K LB TH-HR/CYCLE:                34.958
                         LBS POLLUTANT/1000K LB TH AT T.O.:               0.463


  MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     HC       FUEL     LB HC /    ENERGY    LB HC /
            POWER       # TH      RATE      RATE    WT FACTOR    MODE     MASS      MASS    1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR     LB/HR                 MIN.     LBS.      LBS.

TAXI-IDLE   0.050       900.0  230.501    663.377    1.000      19.00    72.992    210.07    347.467    285.00    0.25611
TAKEOFF     1.000     18000.0    0.0    10008.262    1.000       0.70     0.0      116.76      0.0      210.00    0.0
CLIMBOUT    0.850     15300.0    0.0     8568.125    1.000       2.20     0.0      314.16      0.0      561.00    0.0
APPROACH    0.400      7200.0    0.0     3870.219    1.000       4.00     0.0      258.01      0.0      480.00    0.0
TAXI-IDLE   0.050       900.0  230.501    663.377    1.000       7.00    26.892     77.39    347.467    105.00    0.25611

                         TOTAL FOR CYCLE:                                99.884    976.41               1641.00
                         LBS POLLUTANT/1K LB FUEL/CYCLE:                102.298
                         LBS POLLUTANT/1K LB TH-HR/CYCLE:                60.868
                         LBS POLLUTANT/1000K LB TH AT T.O.:               0.0


  MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN    NOX       FUEL     LB NOX/    ENERGY    LB NOX/
            POWER       # TH      RATE      RATE    WT FACTOR    MODE     MASS      MASS    1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR     LB/HR                 MIN.     LBS.      LBS.

TAXI-IDLE   0.050       900.0    1.128    663.377    1.000      19.00     0.357    210.07      1.700    285.00    0.00125
TAKEOFF     1.000     18000.0  124.387  10008.262    1.000       0.70     1.451    116.76     12.428    210.00    0.00691
CLIMBOUT    0.850     15300.0   89.156   8568.125    1.000       2.20     3.269    314.16     10.406    561.00    0.00583
APPROACH    0.400      7200.0   18.789   3870.219    1.000       4.00     1.253    258.01      4.855    480.00    0.00261
TAXI-IDLE   0.050       900.0    1.128    663.377    1.000       7.00     0.132     77.39      1.700    105.00    0.00125

                         TOTAL FOR CYCLE:                                 6.462    976.41               1641.00
                         LBS POLLUTANT/1K LB FUEL/CYCLE:                  6.618
                         LBS POLLUTANT/1K LB TH-HR/CYCLE:                 3.938
                         LBS POLLUTANT/1000K LB TH AT T.O.:              80.621
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DATE:   7/ 6/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  128    ENGINE TYPE AND MODEL:  JT3D -3B                 SERIAL NUMBER:    669507

                         RATED THRUST:          18000.

     ENGINE TOTAL TIME:                                  8308. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    8308. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        8308. HRS
          N2 COMPRESSOR OVERHAUL:                       14347. HRS
          COMBUSTOR CAN REPLACEMENT:                     8308. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        8308. HRS
          N1 TURBINE OVERHAUL:                              0. HRS
          N2 TURBINE OVERHAUL:                           8308. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA *********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   64.40   FINISH   66.20

     ATMOSPHERIC PRESSURE:              START   29.82   FINISH   29.89

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0085

     RELATIVE HUMIDITY:                      65.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:     1.50

     SAMPLE LINE TRANSPORT TIME, SEC:     5.00

NUMBER OF TESTS:   4

COMMENTS:

 EXHAUST GAS PRESSURE IN INCHES HG.


 CLOCK      TEST          POWER                 ENGINE             MEASURED    GAS GEN      CALC      COMPRESSOR    ENGINE      TURBINE
  TIME      MODE    THRUST,LBS  PERCENT          SPEED               FUEL     AIR FLOW      F/A       DISCHARGE    PRESSURE      INLET
                        OR      RATED             RPM                FLOW      LB/SEC                   TEMP        RATIO        TEMP
                       SHP      T.O.        N1          N2          LB/HR                            DEGREES F       EPR      DEGREES F

1040.00     1/ 0    9275.00      51     5193.00    9862.00     9436.00     -0.00   -0.000000        -0.00        1.38         -0.00
1050.00     2/ 1   13100.00      72     5877.00    9535.00     7091.00     -0.00   -0.000000        -0.00        1.60         -0.00
1055.00     3/ 2   16350.00      90     6409.00    9933.00     9283.00     -0.00   -0.000000        -0.00        1.83         -0.00
1225.00     4/ 3    1050.00       5     2010.00    5796.00     1192.00     -0.00   -0.000000     [illegible]    -0.00         -0.00


 POWER     EXHAUST      EXHAUST          CO         CO        THC       NO        NO         NO     ALDEHYDES    SMOKE   PARTICULATES
PERCENT      GAS          GAS          (WET)        2        (WET)     (WET)       2          X
 RATED      TEMP       PRESSURE        PPMV      (WET)       PPMV      PPMV     (WET)      (WET)
 T.O.    DEGREES F       PSIA                   PERCENT V                       PPMV       PPMV

   51      705.20       40.80        110.00       2.18       9.00     33.00    -0.00      39.00      -0.00       -0.00      -0.00
   72      806.00       47.13         55.00       2.50       1.50     54.00    -0.00      58.00      -0.00       -0.00      -0.00
   90      919.40       53.70         35.00       2.88       1.20     80.00    -0.00      84.00      -0.00       -0.00      -0.00
    5      536.30       30.99        560.00       1.42    2130.00      4.00    -0.00       4.00      -0.00       -0.00      -0.00


 POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2         NO        NOX
 RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K     LB/HR      LB/HR      LB/HR      LB/HR       LB/HR      LB/HR
 T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   51       10.08       0.47      -0.00    3138.76       4.97       5.87      95.11       4.46      -0.00   29617.30      46.87      55.39
   72        4.41       0.07      -0.00    3148.77       7.11       7.64      31.26       0.49      -0.00   22327.94      50.42      54.15
   90        2.44       0.05      -0.00    3151.93       9.15       9.61      22.63       0.44      -0.00   29759.34      84.97      89.21
    5       66.63     145.07      -0.00    2653.26       0.74       0.78      79.38     172.92      -0.00    3162.69       0.93       0.93


 POWER           CO                 CO                 THC                 NO                 NO                 NO
PERCENT                              2                                                         2                  X
 RATED      LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
 T.O.

   51          10.255           3193.240              0.481              5.053             -0.000              5.972
   72           2.387           1704.423              0.037              3.849             -0.000              4.134
   90           1.384           1799.563              0.027              5.197             -0.000              5.457
    5          75.601           3012.087            164.690              0.887             -0.000              0.887
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     CAL ID NUMBER:  128   ENGINE TYPE AND MODEL: JT3D -3B                 SERIAL NUMBER:   669507

TEST ORGANIZATION:  UNITED/EPA


   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY    LB CO /
             POWER       # TH      RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR     LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.050        900.0  159.059   1000.640     1.000      19.00     50.369     316.87    158.958     285.00    0.17673
TAKEOFF     1.000      18000.0   21.524   9855.355     1.000       0.70      0.251     114.98      2.184     210.00    0.00120
CLIMBOUT    0.850      15300.0   25.454   8722.555     1.000       2.20      0.933     319.83      2.918     561.00    0.00166
APPROACH    0.400       7200.0   53.969   4295.113     1.000       4.00      3.598     286.34     12.565     480.00    0.00750
TAXI-IDLE   0.050        900.0  159.059   1000.640     1.000       7.00     18.557     116.74    158.958     105.00    0.17673

                                 TOTAL FOR CYCLE:                           73.708    1154.76               1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            63.830
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           44.917
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          1.395


   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY    LB HC /
             POWER       # TH      RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR     LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.050        900.0  220.641   1000.640     1.000      19.00     69.870     316.87    220.500     285.00    0.24516
TAKEOFF     1.000      18000.0    0.0     9855.355     1.000       0.70      0.0       114.98      0.0       210.00    0.0
CLIMBOUT    0.850      15300.0    0.0     8722.555     1.000       2.20      0.0       319.83      0.0       561.00    0.0
APPROACH    0.400       7200.0    7.604   4295.113     1.000       4.00      0.507     286.34      1.770     480.00    0.00106
TAXI-IDLE   0.050        900.0  220.641   1000.640     1.000       7.00     25.741     116.74    220.500     105.00    0.24516

                                 TOTAL FOR CYCLE:                           96.118    1154.76               1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            83.237
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           58.573
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          0.0


   MODF    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY    LB NOX/
             POWER       # TH      RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR     LB/HR                 MIN.       LBS.       LBS.

TAXI-IDLE   0.050        900.0    0.629   1000.640     1.000      19.00      0.199     316.87      0.629     285.00    0.00070
TAKEOFF     1.000      18000.0  104.940   9855.355     1.000       0.70      1.224     114.98     10.648     210.00    0.00583
CLIMBOUT    0.850      15300.0   76.438   8722.555     1.000       2.20      2.803     319.83      8.763     561.00    0.00500
APPROACH    0.400       7200.0   20.175   4295.113     1.000       4.00      1.345     286.34      4.697     480.00    0.00280
TAXI-IDLE   0.050        900.0    0.629   1000.640     1.000       7.00      0.073     116.74      0.629     105.00    0.00070

                                 TOTAL FOR CYCLE:                            5.645    1154.76               1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             4.888
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            3.440
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         68.016
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DATE:   0/70/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ******************************************************************************************************************

     CAL ID NUMBER:  130    ENGINE TYPE AND MODEL:  JT3D -3B                  SERIAL NUMBER:    669210

                            RATED THRUST:         18000.

     ENGINE TOTAL TIME:                           12660. HRS

     TIME SINCE HOT SECTION OVERHAUL:                -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                    -0. HRS
          N2 COMPRESSOR OVERHAUL:                    -0. HRS
          COMBUSTOR CAN REPLACEMENT:                 -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    -0. HRS
          N1 TURBINE OVERHAUL:                       -0. HRS
          N2 TURBINE OVERHAUL:                       -0. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA *****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   64.90   FINISH   59.70

     ATMOSPHERIC PRESSURE:              START   29.92   FINISH   30.00

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0068

     RELATIVE HUMIDITY:                    60.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C: 1600.00,  FLOW RATE, LITERS/MIN:    1.50

     SAMPLE LINE TRANSPORT TIME, SEC:    5.00

NUMBER OF TESTS:   4

COMMENTS:

 EXHAUST GAS PRESSURE IS IN INCHES HG.  WITH CI-2 FUEL ADDITIVE


  CLOCK      TEST          POWER                  ENGINE           MEASURED    GAS GEN      CALC      COMPRESSOR    ENGINE      TURBINE
  TIME       MODE    THRUST,LBS  PERCENT          SPEED              FUEL      AIR FLOW     F/A       DISCHARGE    PRESSURE     INLET
                        OR        RATED            RPM               FLOW      LB/SEC                   TEMP        RATIO        TEMP
                        SHP       T.O.        N1         N2         LB/HR                             DEGREES F      EPR      DEGREES F

 1702.00     1/ 0     8982.00       49     5153.00    8820.00     5002.00      -0.00   -0.000000      -0.00        1.36        -0.00
 1715.00     2/ 1    13202.00       73     5901.00    9315.00     7382.00      -0.00   -0.000000      -0.00        1.61        -0.00
 1719.00     3/ 2    16361.00       90     6422.00    9665.00     9518.00      -0.00   -0.000000      -0.00        1.83        -0.00
 1847.00     4/ 3     1085.00        6     2093.00    5803.00     1409.00      -0.00   -0.000000      -0.00       -0.00        -0.00


  POWER    EXHAUST      EXHAUST          CO          CO        THC       NO        NO         NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS           (WET)         2       (WET)     (WET)       2          X
  RATED      TEMP       PRESSURE        PPMV       (WET)      PPMV      PPMV      (WET)      (WET)
  T.O.    DEGREES F       PSIA                   PERCENT V                        PPMV       PPMV

   49       375.00       40.50         210.00        2.18     12.30     34.00     -0.00      37.00     -0.00      -0.00      -0.00
   73       435.00       47.50          85.00        2.60     15.00     64.00     -0.00      66.00     -0.00      -0.00      -0.00
   90       490.00       54.10          50.00        3.02      4.80     98.00     -0.00     100.00     -0.00      -0.00      -0.00
    6       320.00       30.90         895.00        1.77   1200.00     10.00     -0.00      12.00     -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   49       19.15      0.64     -0.00    3124.03      5.09      5.54     95.80      3.21     -0.00   15626.41    25.48     27.73
   73        6.54      0.66     -0.00    3143.40      8.04      8.34     48.20      4.98     -0.00   23207.52    59.72     61.59
   90        3.32      0.18     -0.00    3150.17     10.69     10.90     31.59      1.74     -0.00   29983.35   101.71    103.79
    6       90.31     69.74     -0.00    2821.89      1.67      2.00    127.96     98.26     -0.00    3976.03     2.35      2.82


  POWER         CO               CO              THC               NO               NO               NO
 PERCENT                          2                                                  2                X
  RATED    LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR
  T.O.

   49        10.666         1739.748           0.358            2.837           -0.000            3.087
   73         3.658         1757.879           0.370            4.524           -0.000            4.665
   90         1.931         1832.612           0.106            6.217           -0.000            6.344
    6       117.932         3664.551          90.560            2.164           -0.000            2.597
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     CAL ID NUMBER:  150   ENGINE TYPE AND MODEL: JT3D -3B              SERIAL NUMBER:   669210

TEST ORGANIZATION:  UNITED/EPA


  MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE       TIME IN       CO          FUEL      LB CO /      ENERGY    LB CO /
            POWER        # TH       RATE       RATE      WT FACTOR      MODE        MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                     MIN.        LBS.         LBS.

TAXI-IDLE   0.050        900.0  103.946    1131.970      1.000         19.00      32.916       358.46      91.828      285.00     0.11550
TAKEOFF     1.000      18000.0   17.913   10741.891      1.000          0.70       0.209       125.32       1.668      210.00     0.00100
CLIMBOUT    0.850      15300.0   33.587    8841.145      1.000          2.20       1.232       324.18       3.799      561.00     0.00220
APPROACH    0.400       7200.0  114.785    4174.469      1.000          4.00       7.652       278.30      27.497      480.00     0.01594
TAXI-IDLE   0.050        900.0  103.946    1131.970      1.000          7.00      12.127       132.06      91.828      105.00     0.11550

                                TOTAL FOR CYCLE:                                  54.136      1218.31                 1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                   44.435
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:                  32.990
                                LBS POLLUTANT/1000K LB TH AT T.O.:                 1.161


  MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE       TIME IN       HC          FUEL      LB HC /      ENERGY    LB HC /
            POWER        # TH       RATE       RATE      WT FACTOR      MODE        MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                     MIN.        LBS.         LBS.

TAXI-IDLE   0.050        900.0   87.223    1131.970      1.000         19.00      27.621       358.46      77.054      285.00     0.09691
TAKEOFF     1.000      18000.0    0.0     10741.891      1.000          0.70       0.0         125.32       0.0        210.00     0.0
CLIMBOUT    0.850      15300.0    2.260    8841.145      1.000          2.20       0.083       324.18       0.256      561.00     0.00015
APPROACH    0.400       7200.0    6.139    4174.469      1.000          4.00       0.409       278.30       1.471      480.00     0.00085
TAXI-IDLE   0.050        900.0   87.223    1131.970      1.000          7.00      10.176       132.06      77.054      105.00     0.09691

                                TOTAL FOR CYCLE:                                  38.289      1218.31                 1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                   31.428
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:                  23.333
                                LBS POLLUTANT/1000K LB TH AT T.O.:                 0.0


  MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE       TIME IN      NOX          FUEL      LB NOX/      ENERGY    LB NOX/
            POWER        # TH       RATE       RATE      WT FACTOR      MODE        MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                     MIN.        LBS.         LBS.

TAXI-IDLE   0.050        900.0    1.915    1131.970      1.000         19.00       0.606       358.46       1.692      285.00     0.00213
TAKEOFF     1.000      18000.0  133.762   10741.891      1.000          0.70       1.561       125.32      12.452      210.00     0.00743
CLIMBOUT    0.850      15300.0   89.157    8841.145      1.000          2.20       3.269       324.18      10.084      561.00     0.00583
APPROACH    0.400       7200.0   20.411    4174.469      1.000          4.00       1.361       278.30       4.890      480.00     0.00283
TAXI-IDLE   0.050        900.0    1.915    1131.970      1.000          7.00       0.223       132.06       1.692      105.00     0.00213

                                TOTAL FOR CYCLE:                                   7.020      1218.31                 1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                    5.762
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:                   4.278
                                LBS POLLUTANT/1000K LB TH AT T.O.:                86.698
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DATE:   7/16/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:  133    ENGINE TYPE AND MODEL:  JT3D -3B                    SERIAL NUMBER:     645064

                              RATED THRUST:        18000.

     ENGINE TOTAL TIME:                                8016. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  2992. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      2992. HRS
          N2 COMPRESSOR OVERHAUL:                     12527. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                         1285. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   55.22   FINISH   58.28

     ATMOSPHERIC PRESSURE:              START   29.78   FINISH   29.87

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0082

     RELATIVE HUMIDITY:                      88.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:     1.50

     SAMPLE LINE TRANSPORT TIME, SEC:    5.00

NUMBER OF TESTS:   4

COMMENTS:

 EXHAUST GAS PRESSURE IN INCHES HG.
 PRE-REPAIR TYPE ENGINE.


  CLOCK      TEST          POWER                    ENGINE             MEASURED    GAS GEN      CALC      COMPRESSOR     ENGINE      TURBINE
   TIME      MODE    THRUST,LBS  PERCENT             SPEED                FUEL     AIR FLOW      F/A      DISCHARGE     PRESSURE      INLET
                         OR        RATED              RPM                 FLOW      LB/SEC                   TEMP         RATIO        TEMP
                        SHP        T.O.         N1          N2           LB/HR                            DEGREES F       EPR       DEGREES F

  830.00     1/ 0     8745.00        48      5046.00     8846.00      4562.00      -0.00   -0.000000       -0.00         1.35         -0.00
  842.00     2/ 1    13102.00        72      5819.00     9359.00      6923.00      -0.00   -0.000000       -0.00         1.60         -0.00
  847.00     3/ 2    16511.00        91      6404.00     9779.00      9269.00      -0.00   -0.000000       -0.00         1.85         -0.00
  946.00     4/ 3     1010.00         5      2037.00     5861.00      1191.00      -0.00   -0.000000       -0.00        -0.00         -0.00


  POWER    EXHAUST       EXHAUST          CO          CO       THC       NO        NO         NO      ALDEHYDES    SMOKE    PARTICULATES
 PERCENT    GAS           GAS           (WET)         2       (WET)    (WET)       2          X
  RATED     TEMP        PRESSURE        PPMV        (WET)      PPMV     PPMV     (WET)      (WET)
  T.O.   DEGREES F        PSIA                    PERCENT V                       PPMV       PPMV

   48      663.80        40.90          95.00       2.15     10.50     32.00     -0.00      43.00      -0.00      -0.00       -0.00
   72      773.60        47.10          60.00       2.51      1.80     68.00     -0.00      62.00      -0.00      -0.00       -0.00
   91      883.40        54.30          42.00       3.10      1.50     99.00     -0.00     104.00      -0.00      -0.00       -0.00
    5      519.80        30.80         995.00       1.51   1200.00      9.60     -0.00      10.00      -0.00      -0.00       -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   48        8.83      0.56     -0.00   3140.48      4.89      6.57     40.29      2.55     -0.00  14326.86     22.29     29.95
   72        4.79      0.08     -0.00   3148.14      8.92      8.13     33.16      0.57     -0.00  21794.56     61.73     56.28
   91        2.72      0.06     -0.00   3151.47     10.52     11.05     25.19      0.52     -0.00  29210.94     97.52    102.45
    5      115.55     79.82     -0.00   2755.36      1.83      1.91    137.63     95.06     -0.00   3281.63      2.18      2.27


  POWER          CO               CO               THC               NO                NO               NO
 PERCENT                           2                                                    2                X
  RATED     LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR
  T.O.

   48           4.607         1638.292            0.292            2.549           -0.000            3.425
   72           2.531         1663.453            0.043            4.711           -0.000            4.295
   91           1.525         1769.142            0.031            5.906           -0.000            6.205
    5         136.263         3249.141           94.120            2.159           -0.000            2.249
    CAL ID NUMBER:  133   ENGINE TYPE AND MODEL: JT3D -3B              SERIAL NUMBER:   645064

 TEST ORGANIZATION:  UNITED/EPA


  MODE    FRACTIONAL    POWER   EMISSION     FUEL        USAGE      TIME IN      CO          FUEL      LB CO /      ENERGY    LB CO /
            POWER       # TH      RATE       RATE      WT FACTOR     MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                 LB/HR      LB/HR                    MIN.       LBS.         LBS.

 TAXI-IDLF   0.050       900.0  253.721    971.948     1.000       19.00     80.345       307.78    261.044      285.00     0.28191
 TAKEOFF     1.000     18000.0   18.876  10223.277     1.000        0.70      0.220       119.27      1.846      210.00     0.00105
 CLIMBOUT    0.850     15300.0   23.474   8348.531     1.000        2.20      0.861       306.11      2.812      561.00     0.00153
 APPROACH    0.400      7200.0   42.979   3887.598     1.000        4.00      2.865       259.17     11.055      480.00     0.00597
 TAXI-IDLE   0.050       900.0  253.721    971.948     1.000        7.00     29.601       113.39    261.044      105.00     0.28191

                                TOTAL FOR CYCLE:                          113.892      1105.73                 1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:           103.001
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           69.404
                                LBS POLLUTANT/1000K LB TH AT T.O.:          1.223


  MODE    FRACTIONAL    POWER   EMISSION     FUEL        USAGE      TIME IN      HC          FUEL      LB HC /      ENERGY    LB HC /
            POWER       # TH      RATE       RATE      WT FACTOR     MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                 LB/HR      LB/HR                    MIN.       LBS.         LBS.

 TAXI-IDLE   0.050       900.0   95.306    971.948     1.000       19.00     30.180       307.78     98.057      285.00     0.10590
 TAKEOFF     1.000     18000.0   0.0     10223.277     1.000        0.70     0.0          119.27     0.0         210.00     0.0
 CLIMBOUT    0.850     15300.0   0.0      8348.531     1.000        2.20     0.0          306.11     0.0         561.00     0.0
 APPROACH    0.400      7200.0    3.649   3887.598     1.000        4.00      0.243       259.17      0.939      480.00     0.00051
 TAXI-IDLE   0.050       900.0   95.306    971.948     1.000        7.00     11.119       113.39     98.057      105.00     0.10590

                                TOTAL FOR CYCLE:                           41.543      1105.73                 1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            37.570
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           25.315
                                LBS POLLUTANT/1000K LB TH AT T.O.:          0.0


  MODE    FRACTIONAL    POWER   EMISSION     FUEL        USAGE      TIME IN     NOX          FUEL      LB NOX/      ENERGY    LB NOX/
            POWER       # TH      RATE       RATE      WT FACTOR     MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                 LB/HR      LB/HR                    MIN.       LBS.         LBS.

 TAXI-IDLE   0.050       900.0    1.675    971.948     1.000       19.00      0.530       307.78      1.723      285.00     0.00186
 TAKEOFF     1.000     18000.0  129.334  10223.277     1.000        0.70      1.509       119.27     12.651      210.00     0.00719
 CLIMBOUT    0.850     15300.0   80.936   8348.531     1.000        2.20      2.968       306.11      9.695      561.00     0.00529
 APPROACH    0.400      7200.0   22.503   3887.598     1.000        4.00      1.500       259.17      5.788      480.00     0.00313
 TAXI-IDLE   0.050       900.0    1.675    971.948     1.000        7.00      0.195       113.39      1.723      105.00     0.00186

                                TOTAL FOR CYCLE:                            6.702      1105.73                 1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             6.062
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:            4.084
                                LBS POLLUTANT/1000K LB TH AT T.O.:         83.827
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DATE:   7/23/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA *****************************************************************************************************

     CAL ID NUMBER:  136    ENGINE TYPE AND MODEL:  JT3D -3B                         SERIAL NUMBER:    669303

                            RATED THRUST:        18000.

     ENGINE TOTAL TIME:                                    9064. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      1137. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                           -0. HRS
          N2 COMPRESSOR OVERHAUL:                           -0. HRS
          COMBUSTOR CAN REPLACEMENT:                        -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:           -0. HRS
          N1 TURBINE OVERHAUL:                               0. HRS
          N2 TURBINE OVERHAUL:                              -0. HRS

     FUEL: JET - A               FUEL H/C RATIO:   1.920

OPERATIONAL DATA *******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   62.60   FINISH   59.00

     ATMOSPHERIC PRESSURE:              START   29.92   FINISH   29.92

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0103

     RELATIVE HUMIDITY:                      72.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:     5.00

     SAMPLE LINE TRANSPORT TIME, SEC:    5.00

 NUMBER OF TESTS:   4

 COMMENTS:

  EXHAUST GAS TEMPERATURE IN DEGREES C
  EXHAUST GAS PRESSURE IN INCHES HG.


                                                                                                     COMPRESSOR    ENGINE       TURBINE
                                 POWER                 ENGINE           MEASURED   GAS GEN      CALC      DISCHARGE    PRESSURE      INLET
  CLOCK      TEST                                      SPEED              FUEL     AIR FLOW      F/A         TEMP        RATIO        TEMP
  TIME       MODE        THRUST,LBS   PERCENT           RPM               FLOW      LB/SEC                DEGREES F      EPR       DEGREES F
                            OR        RATED                               LB/HR
                            SHP       T.O.        N1         N2

                                                                                                                          1.36         -0.00
  -0.00      1/ 0         8963.00       49     5116.00    8951.00     4838.00     -0.00    -0.000000      -0.00          1.59         -0.00
  -0.00      2/ 1        12815.00       71     5746.00    9417.00     6963.00     -0.00    -0.000000      -0.00          1.83         -0.00
  -0.00      3/ 2        16267.00       90     6361.00    9812.00     9272.00     -0.00    -0.000000      -0.00         -0.00         -0.00
  -0.00      4/ 3          598.00        5     2034.00    5849.00     1208.00     -0.00    -0.000000      -0.00


                                                                                 NO          NO      ALDEHYDES    SMOKE    PARTICULATES
  POWER     EXHAUST       EXHAUST          CO          CO         THC        NO          2           X
  PERCENT     GAS           GAS           (WET)         2         (WET)      (WET)     (WET)       (WET)
  RATED      TEMP        PRESSURE         PPMV        (WET)       PPMV       PPMV      PPMV        PPMV
  T.O.     DEGREES F       PSIA                     PERCENT V

                                                                                                  -0.00        -0.00       -0.00
   49       375.00         40.40         110.00        2.30        0.10      34.00     -0.00      44.00       -0.00        -0.00       -0.00
   71       428.00         46.90          60.00        2.55        1.20      57.60     -0.00      63.60       -0.00        -0.00       -0.00
   90       486.00         53.90          40.70        2.65        0.66      88.00     -0.00      93.00       -0.00        -0.00       -0.00
    5       270.30         30.80         930.00        1.42     1960.00       9.40     -0.00      10.20


                                                                            MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
  POWER     MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI     CO         HC         NO2        CO2        NO         NOX
  PERCENT      CO         HC         NO2        CO2        NO         NOX      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  RATED      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K
  T.O.      LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   49         9.56       0.00      -0.00     3140.85      4.85       6.28      46.25       0.02      -0.00    15195.45     23.48      30.39
   71         4.71       0.05      -0.00     3148.33      7.43       8.21      32.83       0.38      -0.00    21921.85     51.77      57.16
   90         3.03       0.03      -0.00     3151.05     10.94      11.56      28.07       0.27      -0.00    29216.57    101.43     107.19
    5       109.94     125.94      -0.00     2637.65      1.83       1.98     132.81     152.13      -0.00     3196.28      2.20       2.39


                                                                                   NO              NO
  POWER          CO              CO              THC             NO                 2               X
  PERCENT                         2                                          LB/1K*TH-HR     LB/1K*TH-HR
  RATED      LB/1K*TH-HR     LB/1K*TH-HR     LB/1K*TH-HR     LB/1K*TH-HR
  T.O.

   49           5.163        1495.354           0.003           2.620          -0.000           3.391
   71           2.562        1713.640           0.029           4.039          -0.000           4.460
   90           1.725        1796.064           0.016           6.235          -0.000           6.589
    5         133.179        3192.462         152.435           2.209          -0.000           2.397
    CAL ID NUMBER:  136   ENGINE TYPE AND MODEL: JT3D -3B            SERIAL NUMBER:   669303

TEST ORGANIZATION:  UNITED/EPA


   MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN      CO        FUEL      LB CO /     ENERGY    LB CO /
              POWER       # TH       RATE       RATE      WT FACTOR    MODE       MASS       MASS     1K LB FUEL   # TH-HR   # TH-HR
                                     LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE    0.050       900.0  124.306    1133.015     1.000        19.00    39.364     358.79    109.713     285.00     0.13812
TAKEOFF      1.000     18000.0   21.156   10517.309     1.000         0.70     0.247     122.70      2.011     210.00     0.00118
CLIMBOUT     0.850     15300.0   25.372    8653.250     1.000         2.20     0.930     317.29      2.932     561.00     0.00166
APPROACH     0.400      7200.0   63.594    4028.169     1.000         4.00     4.240     268.54     15.787     480.00     0.00883
TAXI-IDLE    0.050       900.0  124.306    1133.015     1.000         7.00    14.502     132.18    109.713     105.00     0.13812

                                TOTAL FOR CYCLE:                              59.283    1199.50                1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:               49.423
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:              36.126
                                LBS POLLUTANT/1000K LB TH AT T.O.:             1.371


   MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN      HC        FUEL      LB HC /     ENERGY    LB HC /
              POWER       # TH       RATE       RATE      WT FACTOR    MODE       MASS       MASS     1K LB FUEL   # TH-HR   # TH-HR
                                     LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE    0.050       900.0  145.806    1133.015     1.000        19.00    46.172     358.79    128.689     285.00     0.16201
TAKEOFF      1.000     18000.0    0.0     10517.309     1.000         0.70     0.0       122.70      0.0       210.00     0.0
CLIMBOUT     0.850     15300.0    0.0      8653.250     1.000         2.20     0.0       317.29      0.0       561.00     0.0
APPROACH     0.400      7200.0   10.969    4028.169     1.000         4.00     0.731     268.54      2.723     480.00     0.00152
TAXI-IDLE    0.050       900.0  145.806    1133.015     1.000         7.00    17.011     132.18    128.689     105.00     0.16201

                                TOTAL FOR CYCLE:                              63.914    1199.50                1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:               53.284
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:              38.948
                                LBS POLLUTANT/1000K LB TH AT T.O.:             0.0


   MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN      NOX       FUEL      LB NOX/     ENERGY    LB NOX/
              POWER       # TH       RATE       RATE      WT FACTOR    MODE       MASS       MASS     1K LB FUEL   # TH-HR   # TH-HR
                                     LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE    0.050       900.0    2.129    1133.015     1.000        19.00     0.674     358.79      1.879     285.00     0.00237
TAKEOFF      1.000     18000.0  144.115   10517.309     1.000         0.70     1.681     122.70     13.703     210.00     0.00801
CLIMBOUT     0.850     15300.0   91.373    8653.250     1.000         2.20     3.350     317.29     10.559     561.00     0.00597
APPROACH     0.400      7200.0   22.227    4028.169     1.000         4.00     1.482     268.54      5.518     480.00     0.00309
TAXI-IDLE    0.050       900.0    2.129    1133.015     1.000         7.00     0.248     132.18      1.879     105.00     0.00237

                                TOTAL FOR CYCLE:                               7.436    1199.50                1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                6.199
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:               4.531
                                LBS POLLUTANT/1000K LB TH AT T.O.:            93.408
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DATE:   7/27/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ******************************************************************************************

    CAL ID NUMBER:  282    ENGINE TYPE AND MODEL:  JT3D -3B                 SERIAL NUMBER:   P643849B

                          RATED THRUST:        18000.

    ENGINE TOTAL TIME:                          11564. HRS

    TIME SINCE HOT SECTION OVERHAUL:             1564. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                 5936. HRS
         N2 COMPRESSOR OVERHAUL:                 5936. HRS
         COMBUSTOR CAN REPLACEMENT:              5936. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 5936. HRS
         N1 TURBINE OVERHAUL:                    5936. HRS
         N2 TURBINE OVERHAUL:                    5936. HRS

    FUEL: JP-4 TF             FUEL H/C RATIO:   2.020

OPERATIONAL DATA ******************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   75.00   FINISH   75.00

    ATMOSPHERIC PRESSURE:              START   28.98   FINISH   28.98

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0094

    RELATIVE HUMIDITY:                   49.00 PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

    SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   6

COMMENTS:

 F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FIFTH RUN.  NO2
 DETERMINED BY SUBTRACTION.


 ELAPSED   TEST         POWER               ENGINE          MEASURED   GAS GEN      CALC    COMPRESSOR   ENGINE    TURBINE
  TIME     MODE    THRUST,LBS  PERCENT      SPEED            FUEL     AIR FLOW      F/A    DISCHARGE   PRESSURE    INLET
                       OR       RATED        RPM             FLOW      LB/SEC                  TEMP       RATIO      TEMP
                      SHP       T.O.     N1        N2        LB/HR                          DEGREES F     EPR    DEGREES F

   0.0     6/ 0    9100.00       50    5440.00   9160.00    5110.00    126.00   0.011300     -0.00       1.37      -0.00
   4.30    1/ 6   11200.00       62    5860.00   9460.00    6320.00    142.30   0.012300     -0.00      -0.00      -0.00
  13.00    2/ 1   13200.00       73    6280.00   9730.00    7650.00    157.60   0.013500     -0.00      -0.00      -0.00
  28.00    3/ 2   15420.00       85    6680.00  10080.00    9400.00    173.90   0.015000     -0.00      -0.00      -0.00
  34.00    4/ 3    1100.00        6    2160.00   6150.00    1110.00     34.70   0.008000     -0.00      -0.00      -0.00
  36.30    5/ 4   14900.00       82    6560.00   9890.00    8940.00    170.00   0.014600     -0.00      -0.00      -0.00


                                                                      NO        NO    ALDEHYDES   SMOKE   PARTICULATES
 POWER    EXHAUST    EXHAUST       CO        CO       THC      NO      2         X
PERCENT     GAS        GAS       (WET)       2      (WET)    (WET)  (WET)     (WET)
 RATED      TEMP     PRESSURE     PPMV     (WET)     PPMV     PPMV   PPMV      PPMV
 T.O.    DEGREES F    PSIA               PERCENT V

  50       739.00      4.80      43.00     2.09      1.00    36.00   2.00     38.00    -0.00     -0.00     -0.00
  62       797.00      6.50      20.00     2.27     12.00    47.00   2.00     49.00    -0.00     -0.00     -0.00
  73       862.00      8.50       9.00     2.49      3.00    74.00   1.00     75.00    -0.00     -0.00     -0.00
  85       961.00     10.90       8.00     2.77      0.0     91.00   0.0      91.00    -0.00     -0.00     -0.00
   6       554.00      0.30     649.00     1.44   1025.00     2.00   7.00      9.00    -0.00     -0.00     -0.00
  82       941.00     10.20      12.00     2.69     20.00    80.00   1.00     81.00    -0.00     -0.00     -0.00


 POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  50       4.09      0.05      0.31    3126.66     5.63      5.94     20.92      0.26      1.60   15977.23    28.77     30.37
  62       1.75      0.60      0.29    3128.83     6.77      7.06     11.09      3.81      1.82   19774.20    42.90     44.62
  73       0.72      0.14      0.13    3131.73     9.73      9.86      5.51      1.05      1.01   23957.75    74.43     75.44
  85       0.58      0.0       0.0     3132.34    10.76     10.76      5.41      0.0       0.0    29443.96   101.12    101.12
   6      80.51     72.93      1.41    2806.94     0.41      1.83     89.37     80.84      1.58    3115.70     0.45      2.04
  82       0.89      0.85      0.12    3129.52     9.73      9.85      7.94      7.56      1.09   27977.89    86.98     88.07


                                                                         NO             NO
 POWER        CO             CO            THC           NO               2               X
PERCENT                       2
 RATED    LB/1K#TH-HR    LB/1K#TH-HR    LB/1K#TH-HR    LB/1K#TH-HR    LB/1K#TH-HR    LB/1K#TH-HR
 T.O.

  50         2.299       1755.740         0.031          3.162          0.176          3.337
  62         0.990       1765.554         0.340          3.822          0.163          3.984
  73         0.418       1814.981         0.080          5.639          0.076          5.715
  85         0.351       1909.466         0.0            6.558          0.0            6.558
   6        81.247       2832.453        73.490          0.411          1.439          1.851
  82         0.533       1877.710         0.509          5.838          0.073          5.911
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     CAL ID NUMBER:  282   ENGINE TYPE AND MODEL: JT3D -3B             SERIAL NUMBER:  P643849B

TEST ORGANIZATION:  S W R I TWA


  MODE    FRACTIONAL    POWER   EMISSION     FUEL      USAGE     TIME IN     CO         FUEL     LB CO /     ENERGY    LB CO /
            POWER       # TH      RATE       RATE    WT FACTOR    MODE      MASS        MASS   1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR      LB/HR                 MIN.      LBS.        LBS.

TAXI-IDLE   0.050      900.0    80.303    907.073     1.000      19.00    25.429      287.24     88.530    285.00     0.08923
TAKEOFF     1.000    18000.0     3.952  11810.000     1.000       0.70     0.046      137.78      0.335    210.00     0.00022
CLIMBOUT    0.850    15300.0     9.337   9419.023     1.000       2.20     0.342      345.36      0.991    561.00     0.00061
APPROACH    0.400     7200.0    41.424   4212.953     1.000       4.00     2.762      280.86      9.832    480.00     0.00575
TAXI-IDLE   0.050      900.0    80.303    907.073     1.000       7.00     9.369      105.83     88.530    105.00     0.08923

                                TOTAL FOR CYCLE:                          37.948     1157.08               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:           32.797
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:          23.125
                                LBS POLLUTANT/1000K LB TH AT T.O.:         0.256


  MODE    FRACTIONAL    POWER   EMISSION     FUEL      USAGE     TIME IN     HC         FUEL     LB HC /     ENERGY    LB HC /
            POWER       # TH      RATE       RATE    WT FACTOR    MODE      MASS        MASS   1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR      LB/HR                 MIN.      LBS.        LBS.

TAXI-IDLE   0.050      900.0    80.978    907.073     1.000      19.00    25.643      287.24     89.274    285.00     0.08998
TAKEOFF     1.000    18000.0     1.771  11810.000     1.000       0.70     0.021      137.78      0.150    210.00     0.00010
CLIMBOUT    0.850    15300.0     2.459   9419.023     1.000       2.20     0.090      345.36      0.261    561.00     0.00016
APPROACH    0.400     7200.0     0.285   4212.953     1.000       4.00     0.019      280.86      0.068    480.00     0.00004
TAXI-IDLE   0.050      900.0    80.978    907.073     1.000       7.00     9.447      105.83     89.274    105.00     0.08998

                                TOTAL FOR CYCLE:                          35.220     1157.08               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:           30.439
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:          21.463
                                LBS POLLUTANT/1000K LB TH AT T.O.:         1.148


  MODE    FRACTIONAL    POWER   EMISSION     FUEL      USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY    LB NOX/
            POWER       # TH      RATE       RATE    WT FACTOR    MODE      MASS        MASS   1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR      LB/HR                 MIN.      LBS.        LBS.

TAXI-IDLE   0.050      900.0     1.445    907.073     1.000      19.00     0.458      287.24      1.593    285.00     0.00161
TAKEOFF     1.000    18000.0   151.117  11810.000     1.000       0.70     1.763      137.78     12.796    210.00     0.00840
CLIMBOUT    0.850    15300.0   100.314   9419.023     1.000       2.20     3.678      345.36     10.650    561.00     0.00656
APPROACH    0.400     7200.0    19.344   4212.953     1.000       4.00     1.290      280.86      4.592    480.00     0.00269
TAXI-IDLE   0.050      900.0     1.445    907.073     1.000       7.00     0.169      105.83      1.593    105.00     0.00161

                                TOTAL FOR CYCLE:                           7.357     1157.08               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            6.358
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           4.483
                                LBS POLLUTANT/1000K LB TH AT T.O.:        97.946
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DATE: 7/30/71

TEST ORGANIZATION: S W R I TWA

ENGINE SUPPLIER: T W A

ENGINE DATA **

CAL ID NUMBER: 301 ENGINE TYPE AND MODEL: JT3D -3B SERIAL NUMBER: (TWA3130)

RATED THRUST: 18000.

ENGINE TOTAL TIME: 10673. HRS

TIME SINCE HOT SECTION OVERHAUL: 3939. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	3939. HRS
N2 COMPRESSOR OVERHAUL:	3939. HRS
COMBUSTOR CAN REPLACEMENT:	3939. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	3939. HRS
N1 TURBINE OVERHAUL:	3939. HRS
N2 TURBINE OVERHAUL:	3939. HRS

FUEL: JP-4 TF FUEL H/C RATIO: 2.020

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 61.00 FINISH 60.00

ATMOSPHERIC PRESSURE: START 29.09 FINISH 29.10

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0074

RELATIVE HUMIDITY: 65.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.0C, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 6

COMMENTS:

F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FIFTH RUN. NO2 DETERMINED BY SUBTRACTION.

ELAPSED TIME	TEST MODE	POWER THRUST, LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	6/ 0	8960.00	49	5330.00	9000.00	4950.00	127.40	0.010900	-0.00	1.37	-0.00
5.00	1/ 6	10860.00	60	5800.00	9270.00	6070.00	143.00	0.011800	-0.00	-0.00	-0.00
15.00	2/ 1	13060.00	72	6110.00	9540.00	7390.00	158.50	0.013000	-0.00	-0.00	-0.00
32.00	3/ 2	15320.00	85	6580.00	9860.00	9180.00	175.00	0.014600	-0.00	-0.00	-0.00
35.30	4/ 3	1040.00	5	2050.00	5950.00	960.00	30.60	0.008700	-0.00	-0.00	-0.00
40.00	5/ 4	14440.00	80	6430.00	9650.00	8670.00	169.20	0.014200	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
49	705.00	4.80	43.00	2.16	4.00	30.00	8.00	38.00	-0.00	-0.00	-0.00
60	752.00	6.50	18.00	2.34	0.0	43.00	6.00	49.00	-0.00	-0.00	-0.00
72	813.00	8.40	9.00	2.58	0.0	61.00	4.00	65.00	-0.00	-0.00	-0.00
85	901.00	11.10	5.00	2.88	0.0	89.00	4.00	93.00	-0.00	-0.00	-0.00
5	541.00	0.40	583.00	1.80	910.00	3.00	7.00	10.00	-0.00	-0.00	-0.00
80	864.00	10.10	6.00	2.80	0.0	76.00	5.00	81.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
49	3.96	0.21	1.21	3126.44	4.54	5.75	19.61	1.04	5.99	15475.88	22.47	28.46
60	1.53	0.0	0.84	3130.83	6.01	6.85	9.30	0.0	5.09	19004.15	36.51	41.60
72	0.70	0.0	0.51	3132.15	7.74	8.25	5.14	0.0	3.75	23146.57	57.21	60.96
85	0.35	0.0	0.45	3132.70	10.12	10.58	3.18	0.0	4.18	28758.15	92.91	97.08
5	59.64	53.32	1.18	2893.26	0.50	1.68	57.26	51.18	1.13	2777.53	0.48	1.61
80	0.43	0.0	0.59	3132.57	8.89	9.47	3.70	0.0	5.07	27159.36	77.07	82.14

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_x LB/1K#TH-HR
49	2.188	1727.219	0.117	2.508	0.669	3.177
60	0.857	1743.922	0.0	3.362	0.469	3.831
72	0.393	1772.326	0.0	4.381	0.287	4.668
85	0.207	1877.164	0.0	6.064	0.273	6.337
5	55.053	2670.706	49.216	0.465	1.086	1.551
80	0.257	1880.842	0.0	5.337	0.351	5.688

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     CAL ID NUMBER:  301   ENGINE TYPE AND MODEL: JT3D -3B              SERIAL NUMBER:  (TWA3130)

TFST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      CO        FUEL     LB CO /    ENERGY   LB CO /
            POWER       # TH      RATE      RATE     WT FACTOR     MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.050      900.0    46.291    758.395     1.000       19.00    14.659     240.16     61.038    285.00    0.05143
TAKEOFF     1.000    18000.0     7.433  10680.215     1.000        0.70     0.087     124.60      0.696    210.00    0.00041
CLIMBOUT    0.850    15300.0     6.336   9007.215     1.000        2.20     0.232     330.26      0.703    561.00    0.00041
APPROACH    0.400     7200.0    31.120   4052.942     1.000        4.00     2.075     270.20      7.678    480.00    0.00432
TAXI-IDLE   0.050      900.0    46.291    758.395     1.000        7.00     5.401      88.48     61.038    105.00    0.05143

                                TOTAL FOR CYCLE:                           22.453    1053.70               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            21.309
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           13.683
                                LBS POLLUTANT/1000K LB TH AT T.O.:          0.482


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      HC        FUEL     LB HC /    ENERGY   LB HC /
            POWER       # TH      RATE      RATE     WT FACTOR     MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.050      900.0    45.653    758.395     1.000       19.00    14.457     240.16     60.197    285.00    0.05073
TAKEOFF     1.000    18000.0     1.074  10680.215     1.000        0.70     0.013     124.60      0.101    210.00    0.00006
CLIMBOUT    0.850    15300.0     1.362   9007.215     1.000        2.20     0.050     330.26      0.151    561.00    0.00009
APPROACH    0.400     7200.0     4.011   4052.942     1.000        4.00     0.267     270.20      0.990    480.00    0.00056
TAXI-IDLE   0.050      900.0    45.653    758.395     1.000        7.00     5.326      88.48     60.197    105.00    0.05073

                                TOTAL FOR CYCLE:                           20.113    1053.70               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            19.088
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           12.256
                                LBS POLLUTANT/1000K LB TH AT T.O.:          0.696


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/    ENERGY   LB NOX/
            POWER       # TH      RATE      RATE     WT FACTOR     MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.050      900.0     0.912    758.395     1.000       19.00     0.289     240.16      1.202    285.00    0.00101
TAKEOFF     1.000    18000.0   146.354  10680.215     1.000        0.70     1.707     124.60     13.703    210.00    0.00813
CLIMBOUT    0.850    15300.0    93.930   9007.215     1.000        2.20     3.444     330.26     10.428    561.00    0.00614
APPROACH    0.400     7200.0    19.268   4052.942     1.000        4.00     1.285     270.20      4.754    480.00    0.00268
TAXI-IDLE   0.050      900.0     0.912    758.395     1.000        7.00     0.106      88.48      1.202    105.00    0.00101

                                TOTAL FOR CYCLE:                            6.031    1053.70               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             6.483
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:            4.163
                                LBS POLLUTANT/1000K LB TH AT T.O.:         94.859
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DATE: 8/ 2/71

TEST ORGANIZATION: S W R I TWA

ENGINE SUPPLIER: T W A

ENGINE DATA **

CAL ID NUMBER: 102 ENGINE TYPE AND MODEL: JT3D -3B SERIAL NUMBER: 643558

RATED THRUST: 18000.

ENGINE TOTAL TIME: 4158. HRS

TIME SINCE HOT SECTION OVERHAUL: 4158. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	4158. HRS
N2 COMPRESSOR OVERHAUL:	4158. HRS
COMBUSTOR CAN REPLACEMENT:	4158. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	4158. HRS
N1 TURBINE OVERHAUL:	4158. HRS
N2 TURBINE OVERHAUL:	4158. HRS

FUEL: JP-4 TF FUEL H/C RATIO: 2.020

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 72.00 FINISH 72.00

ATMOSPHERIC PRESSURE: START 28.94 FINISH 28.94

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0120

RELATIVE HUMIDITY: 68.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 6

COMMENTS:

F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FIFTH RUN. NO2 DETERMINED BY SUBTRACTION.

ELAPSED TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	6/ 0	9040.00	50	5420.00	9130.00	5030.00	126.00	0.011100	-0.00	1.37	-0.00
4.15	1/ 6	11180.00	62	5840.00	9420.00	6290.00	142.30	0.012300	-0.00	1.50	-0.00
9.30	2/ 1	13300.00	73	6220.00	9680.00	7630.00	158.50	0.013400	-0.00	1.66	-0.00
14.45	3/ 2	15440.00	85	6670.00	9980.00	9360.00	173.90	0.014900	-0.00	1.84	-0.00
22.00	4/ 3	960.00	5	2030.00	5870.00	1020.00	32.00	0.008900	-0.00	-0.00	-0.00
26.00	5/ 4	15000.00	83	6550.00	9900.00	8950.00	171.00	0.014500	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO 2 (WET) PPMV	NO X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
50	730.00	4.80	52.00	2.21	12.00	34.00	3.00	37.00	-0.00	-0.00	-0.00
62	790.00	6.50	26.00	2.44	2.00	45.00	5.00	50.00	-0.00	-0.00	-0.00
73	856.00	8.60	15.00	2.65	0.0	62.00	3.00	65.00	-0.00	-0.00	-0.00
85	959.00	11.00	23.00	2.89	0.0	85.00	2.00	87.00	-0.00	-0.00	-0.00
5	536.00	0.30	645.00	1.80	710.00	4.00	4.00	8.00	-0.00	-0.00	-0.00
83	930.00	10.30	19.00	2.81	0.0	76.00	3.00	79.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
50	4.68	0.62	0.44	3124.19	5.02	5.47	23.53	3.11	2.23	15714.70	25.27	27.50
62	2.12	0.09	0.67	3129.65	6.03	6.70	13.35	0.59	4.22	19685.50	37.95	42.17
73	1.13	0.0	0.37	3131.47	7.66	8.03	8.61	0.0	2.83	23893.11	58.44	61.27
85	1.72	0.0	0.23	3130.5[illegible]	9.63	9.85	16.13	0.0	2.12	29301.78	90.09	92.21
5	66.45	41.90	0.68	2913.89	0.68	1.35	67.78	42.73	0.69	2972.17	0.69	1.38
83	1.42	0.0	0.35	3131.01	8.85	9.20	12.69	0.0	3.13	28022.55	79.23	82.36

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO 2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO 2 LB/1K#TH-HR	NO X LB/1K#TH-HR
50	2.603	1738.351	0.344	2.796	0.247	3.042
62	1.194	1760.778	0.053	3.395	0.377	3.772
73	0.647	1796.474	0.0	4.394	0.213	4.606
85	1.045	1897.783	0.0	5.835	0.137	5.972
5	70.604	3096.007	44.514	0.719	0.719	1.438
83	0.846	1868.170	0.0	5.282	0.209	5.491

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     CAL ID NUMBER:  302   ENGINE TYPE AND MODEL: JT3D -3B              SERIAL NUMBER:  643558

TEST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL     POWER    EMISSION      FUEL        USAGE     TIME IN      CO         FUEL      LB CO /     ENERGY    LB CO /
             POWER        # TH      RATE        RATE      WT FACTOR     MODE      MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR       LB/HR                    MIN.      LBS.        LBS.

TAXI-IDLE    0.050       900.0    52.797     766.013      1.000       19.00     16.719      242.57     68.924     285.00     0.05866
TAKEOFF      1.000     18000.0    17.397   10620.641      1.000        0.70      0.203      123.91      1.638     210.00     0.00097
CLIMBOUT     0.850     15300.0    15.036    9179.488      1.000        2.20      0.551      336.58      1.638     561.00     0.00098
APPROACH     0.400      7200.0    41.626    4140.949      1.000        4.00      2.775      276.06     10.052     480.00     0.00578
TAXI-IDLE    0.050       900.0    52.797     766.013      1.000        7.00      6.160       89.37     68.924     105.00     0.05866

                                 TOTAL FOR CYCLE:                               26.408     1068.49                1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:                24.715
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:               16.093
                                 LBS POLLUTANT/1000K LB TH AT T.O.:              1.128


  MODE    FRACTIONAL     POWER    EMISSION      FUEL        USAGE     TIME IN      HC         FUEL      LB HC /     ENERGY    LB HC /
             POWER        # TH      RATE        RATE      WT FACTOR     MODE      MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR       LB/HR                    MIN.      LBS.        LBS.

TAXI-IDLE    0.050       900.0    37.698     766.013      1.000       19.00     11.938      242.57     49.214     285.00     0.04189
TAKEOFF      1.000     18000.0     0.858   10620.641      1.000        0.70      0.010      123.91      0.081     210.00     0.00005
CLIMBOUT     0.850     15300.0     1.449    9179.488      1.000        2.20      0.053      336.58      0.158     561.00     0.00009
APPROACH     0.400      7200.0     4.860    4140.949      1.000        4.00      0.324      276.06      1.174     480.00     0.00068
TAXI-IDLE    0.050       900.0    37.698     766.013      1.000        7.00      4.398       89.37     49.214     105.00     0.04189

                                 TOTAL FOR CYCLE:                               16.723     1068.49                1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:                15.651
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:               10.191
                                 LBS POLLUTANT/1000K LB TH AT T.O.:              0.556


  MODE    FRACTIONAL     POWER    EMISSION      FUEL        USAGE     TIME IN      NOX        FUEL      LB NOX/     ENERGY    LB NOX/
             POWER        # TH      RATE        RATE      WT FACTOR     MODE      MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR       LB/HR                    MIN.      LBS.        LBS.

TAXI-IDLE    0.050       900.0     0.758     766.013      1.000       19.00      0.240      242.57      0.989     285.00     0.00084
TAKEOFF      1.000     18000.0   132.511   10620.641      1.000        0.70      1.546      123.91     12.477     210.00     0.00736
CLIMBOUT     0.850     15300.0    87.860    9179.488      1.000        2.20      3.222      336.58      9.571     561.00     0.00574
APPROACH     0.400      7200.0    18.624    4140.949      1.000        4.00      1.242      276.06      4.498     480.00     0.00259
TAXI-IDLE    0.050       900.0     0.758     766.013      1.000        7.00      0.088       89.37      0.989     105.00     0.00084

                                 TOTAL FOR CYCLE:                                6.337     1068.49                1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:                 5.931
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:                3.862
                                 LBS POLLUTANT/1000K LB TH AT T.O.:             85.887
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DATE:   7/23/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ************************************************************************************************

    CAL ID NUMBER:  327    ENGINE TYPE AND MODEL:  JT3D -3B                    SERIAL NUMBER:    P-668815

                             RATED THRUST:        18000.

    ENGINE TOTAL TIME:                                       -0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                         -0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                             -0. HRS
         N2 COMPRESSOR OVERHAUL:                             -0. HRS
         COMBUSTOR CAN REPLACEMENT:                          -0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:             -0. HRS
         N1 TURBINE OVERHAUL:                                -0. HRS
         N2 TURBINE OVERHAUL:                                -0. HRS

    FUEL: JP-4                FUEL H/C RATIO:   2.000

OPERATIONAL DATA ******************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   78.00   FINISH   82.00

    ATMOSPHERIC PRESSURE:              START   29.30   FINISH   29.28

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0121

    RELATIVE HUMIDITY:                     -0.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

    SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   6

COMMENTS:

 SMOKE DENSITY IS VON BRAND MEASURE PARTICULATES ARE IN MG/M**3


 CLOCK      TEST         POWER                    ENGINE            MEASURED    GAS GEN      CALC      COMPRESSOR    ENGINE      TURBINE
 TIME       MODE    THRUST,LBS  PERCENT           SPEED               FUEL      AIR FLOW      F/A      DISCHARGE    PRESSURE      INLET
                        OR       RATED             RPM                FLOW       LB/SEC                   TEMP        RATIO        TEMP
                       SHP       T.O.         N1          N2         LB/HR                             DEGREES F      EPR      DEGREES F

1042.00     1/ 0      850.00       4          0.0      5465.00      915.00      -0.00    -0.000000       -0.00       -0.00       -0.00
1102.00     2/ 1     9675.00      53      5220.00      8995.00     4765.00     128.12     0.010080       -0.00        1.34       -0.00
1120.00     3/ 2    11619.00      64      5580.00      9230.00     5770.00     142.67     0.010950       -0.00        1.43       -0.00
1138.00     4/ 3    13758.00      76      5920.00      9455.00     6830.00     158.37     0.011680       -0.00        1.55       -0.00
1153.00     5/ 4    15715.00      87      6260.00      9690.00     8120.00     160.59     0.013660       -0.00        1.69       -0.00
1205.00     6/ 5    17731.00      98      6660.00      9980.00     9700.00     185.46     0.014140       -0.00        1.83       -0.00


 POWER     EXHAUST      EXHAUST          CO          CO        THC       NO        NO        NO      ALDEHYDES    SMOKE   PARTICULATES
PERCENT      GAS          GAS           (WET)         2        (WET)     (WET)      2         X
 RATED       TEMP       PRESSURE         PPMV       (WET)       PPMV      PPMV     (WET)     (WET)
 T.O.     DEGREES F       PSIA                    PERCENT V                        PPMV      PPMV

   4        -0.00        -0.00          915.80      1.35    1354.20      1.70      5.00      6.70      48.00      14.00      -0.00
  53       700.00        19.53           56.30      2.05       5.00     37.20     10.50     47.70      -0.00      44.00      -0.00
  64       750.00        20.85           36.00      2.21       4.60      0.0      10.60     10.60      -0.00      43.00      -0.00
  76       900.00        22.41           24.40      2.39       3.10     63.50     10.60     74.10      -0.00      44.00      26.00
  87      1096.00        24.34           16.60      2.63       2.70     83.40      6.30     89.70      -0.00      43.00      26.00
  98       955.00        26.37           12.50      2.89      14.60      0.0       4.70      4.70      -0.00      41.00      24.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2        NO       NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR      LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   4      115.97     98.21      1.04    2686.09     0.35      1.39    106.11     89.87      0.95    2457.77     0.32      1.28
  53        5.47      0.28      1.68    3128.39     5.93      7.61     26.06      1.33      7.98   14906.78    28.28     36.26
  64        3.25      0.24      1.57    3131.99     0.0       1.57     18.74      1.37      9.06   18071.59     0.0       9.06
  76        2.04      0.15      1.45    3134.14     8.71     10.16     13.91      1.01      9.92   21406.16    59.46     69.39
  87        1.26      0.12      0.79    3135.44    10.39     11.18     10.23      0.95      6.38   25459.79    94.40     90.78
  98        0.86      0.58      0.53    3134.81     0.0       0.53      8.37      5.60      5.17   30407.61     0.0       5.17


 POWER          CO             CO              THC              NO              NO              NO
PERCENT                         2                                                2               X
 RATED     LB/1K*TH-HR    LB/1K*TH-HR     LB/1K*TH-HR     LB/1K*TH-HR     LB/1K*TH-HR     LB/1K*TH-HR
 T.O.

   4         124.839       2891.492         105.725           0.381           1.120           1.500
  53           2.593       1540.752           0.137           2.923           0.825           3.748
  64           1.512       1555.348           0.118           0.0             0.780           0.780
  76           1.011       1555.906           0.074           4.322           0.721           5.043
  87           0.651       1620.095           0.061           5.371           0.406           5.776
  98           0.472       1714.942           0.316           0.0             0.292           0.292
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     CAL ID NUMBER:  327   ENGINE TYPE AND MODEL: JT3D -3B              SERIAL NUMBER:   P-668815

TEST ORGANIZATION:  PRATT & WHITNEY


   MODE   FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /    ENERGY   LB CO /
            POWER        # TH       RATE       RATE     WT FACTOR     MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.050       900.0    84.190    789.804     1.000       19.00    26.660      250.10    106.596    285.00    0.09354
TAKEOFF     1.000     18000.0    14.863   9872.777     1.000        0.70     0.173      115.18      1.505    210.00    0.00083
CLIMBOUT    0.850     15300.0    17.244   7893.176     1.000        2.20     0.632      289.42      2.185    561.00    0.00113
APPROACH    0.400      7200.0    39.779   3703.266     1.000        4.00     2.652      246.88     10.741    480.00    0.00552
TAXI-IDLE   0.050       900.0    84.190    789.804     1.000        7.00     9.822       92.14    106.596    105.00    0.09354

                                TOTAL FOR CYCLE:                            39.940      993.73               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             40.192
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:            24.339
                                LBS POLLUTANT/1000K LB TH AT T.O.:           0.963


   MODE   FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /    ENERGY   LB HC /
            POWER        # TH       RATE       RATE     WT FACTOR     MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.050       900.0    62.389    789.804     1.000       19.00    19.757      250.10     78.993    285.00    0.06932
TAKEOFF     1.000     18000.0     3.536   9872.777     1.000        0.70     0.041      115.18      0.358    210.00    0.00020
CLIMBOUT    0.850     15300.0     3.824   7893.176     1.000        2.20     0.140      289.42      0.484    561.00    0.00025
APPROACH    0.400      7200.0     6.168   3703.266     1.000        4.00     0.411      246.88      1.666    480.00    0.00086
TAXI-IDLE   0.050       900.0    62.389    789.804     1.000        7.00     7.279       92.14     78.993    105.00    0.06932

                                TOTAL FOR CYCLE:                            27.628      993.73               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             27.802
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:            16.836
                                LBS POLLUTANT/1000K LB TH AT T.O.:           2.292


   MODE   FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/    ENERGY   LB NOX/
            POWER        # TH       RATE       RATE     WT FACTOR     MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.050       900.0     0.846    789.804     1.000       19.00     0.268      250.10      1.071    285.00    0.00094
TAKEOFF     1.000     18000.0   134.745   9872.777     1.000        0.70     1.572      115.18     13.648    210.00    0.00749
CLIMBOUT    0.850     15300.0    88.478   7893.176     1.000        2.20     3.244      289.42     11.209    561.00    0.00578
APPROACH    0.400      7200.0    20.121   3703.266     1.000        4.00     1.341      246.88      5.433    480.00    0.00279
TAXI-IDLE   0.050       900.0     0.846    789.804     1.000        7.00     0.099       92.14      1.071    105.00    0.00094

                                TOTAL FOR CYCLE:                             6.524      993.73               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:              6.565
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:             3.976
                                LBS POLLUTANT/1000K LB TH AT T.O.:          87.334
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DATE:   7/22/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  32A    ENGINE TYPE AND MODEL:  JT3D -3B                  SERIAL NUMBER:    P669797

                            RATED THRUST:        18000.

     ENGINE TOTAL TIME:                                   -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         -0. HRS
          N2 COMPRESSOR OVERHAUL:                         -0. HRS
          COMBUSTOR CAN REPLACEMENT:                      -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         -0. HRS
          N1 TURBINE OVERHAUL:                            -0. HRS
          N2 TURBINE OVERHAUL:                            -0. HRS

     FUEL: JP-4                 FUEL H/C RATIO:   2.000

OPERATIONAL DATA ****************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   62.00   FINISH   77.00

      ATMOSPHERIC PRESSURE:              START   30.00   FINISH   29.20

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0108

      RELATIVE HUMIDITY:                   -0.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

      SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:   6

 COMMENTS:

  SMOKE DENSITY IS VON BRAND MEASURE PARTICULATES ARE IN MG/M**3


  CLOCK      TEST          POWER                ENGINE             MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
  TIME       MODE     THRUST,LBS  PERCENT        SPEED               FUEL     AIR FLOW      F/A     DISCHARGE    PRESSURE      INLET
                          OR       RATED          RPM                FLOW      LB/SEC                  TEMP        RATIO        TEMP
                         SHP       T.O.       N1         N2          LB/HR                          DEGREES F       EPR      DEGREES F

 1640.00     1/ 0       860.00       4     1885.00    5550.00        9.50      32.52    0.007600      -0.00        1.02        -0.00
 1735.00     2/ 1     11625.00      64     5600.00    9210.00     5770.00     143.05    0.010910      -0.00        1.44        -0.00
 1800.00     3/ 2     13660.00      75     5960.00    9440.00     6910.00     159.98    0.011720      -0.00        1.56        -0.00
 1814.00     4/ 3     15672.00      87     6270.00    9640.00     8050.00     173.35    0.012610      -0.00        1.69        -0.00
 1825.00     5/ 4     17653.00      98     6690.00    9940.00     9720.00     186.25    0.014170      -0.00        1.84        -0.00
 1725.00     6/ 5      9400.00      49     5220.00    8980.00     4715.00     127.22    0.010030      -0.00        1.34        -0.00


  POWER    EXHAUST       EXHAUST         CO         CO        THC       NO        NO         NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS           GAS          (WET)        2       (WET)     (WET)       2          X
  RATED     TEMP        PRESSURE        PPMV      (WET)      PPMV      PPMV      (WET)      (WET)
  T.O.    DEGREES F       PSIA                   PERCENT V                        PPMV       PPMV

    4      555.00        15.12        947.10      1.32    1241.20      4.80      0.0         4.80     -0.00      14.00      -0.00
   64      755.00        20.89         31.20      2.23       4.10     51.10      6.60       57.70     -0.00      39.00      -0.00
   75      805.00        22.59         20.70      2.50       4.00     67.70      6.20       73.90     -0.00      43.00      26.00
   87      860.00        24.30         14.90      2.75       3.50     84.50      5.30       89.80     -0.00      40.00      22.00
   98      950.00        26.50         10.90      3.13       3.40    118.50      4.30      122.80     -0.00      36.00      20.00
   49      705.00        19.47         49.30      2.08       6.20     39.70      6.50       46.20     -0.00      37.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2        NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR      LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    4      115.57     92.61      0.0    2702.08      1.03      1.03      1.10      0.88      0.0        25.67      0.01      0.01
   64        2.79      0.21      0.97   3132.79      7.50      8.47     16.10      1.21      5.59   18076.18     43.30     48.69
   75        1.65      0.18      0.81   3134.65      8.87      9.69     11.41      1.26      5.62   21660.41     61.32     66.93
   87        1.07      0.15      0.63   3135.46     10.07     10.70      8.65      1.17      5.09   25242.04     81.09     86.17
   98        0.70      0.12      0.45   3136.31     12.41     12.86      6.75      1.21      4.38   30484.95    120.65    125.03
   49        4.78      0.34      1.02   3129.30      6.24      7.27     22.53      1.60      4.82   14754.66     29.44     34.26


  POWER          CO               CO              THC               NO               NO              NO
 PERCENT                           2                                                  2               X
  RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR     LB/1K#TH-HR
  T.O.

    4          1.277           29.848           1.023            0.011            0.0             0.011
   64          1.385         1554.940           0.134            3.725            0.481           4.206
   75          0.435         1585.681           0.092            4.489            0.411           4.900
   87          0.552         1619.646           0.075            5.174            0.325           5.498
   98          0.383         1726.900           0.068            6.835            0.248           7.083
   49          2.531         1657.828           0.180            3.308            0.542           3.849
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    CAL ID NUMBER:  328   ENGINE TYPE AND MODEL: JT3D -3B                  SERIAL NUMBER:   P669797

TEST ORGANIZATION:  PRATT & WHITNEY

   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      CO        FUEL    LB CO /    ENERGY   LB CO /
             POWER       # TH      RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.050       900.0    22.788    205.820     1.000      19.00      7.216      65.18   110.716    285.00    0.02532
TAKEOFF     1.000     18000.0     9.379   9927.949     1.000       0.70      0.109     115.83     0.945    210.00    0.00052
CLIMBOUT    0.850     15300.0    12.702   7946.180     1.000       2.20      0.466     291.36     1.599    561.00    0.00083
APPROACH    0.400      7200.0    31.830   3318.823     1.000       4.00      2.122     221.25     9.591    480.00    0.00442
TAXI-IDLE   0.050       900.0    22.788    205.820     1.000       7.00      2.659      24.01   110.716    105.00    0.02532

                                 TOTAL FOR CYCLE:                           12.572     717.63              1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            17.518
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            7.661
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          0.608


   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN      HC        FUEL    LB HC /    ENERGY   LB HC /
             POWER       # TH      RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.050       900.0    20.779    205.820     1.000      19.00      6.580      65.18   100.959    285.00    0.02309
TAKEOFF     1.000     18000.0     1.468   9927.949     1.000       0.70      0.017     115.83     0.148    210.00    0.00008
CLIMBOUT    0.850     15300.0     2.655   7946.180     1.000       2.20      0.097     291.36     0.334    561.00    0.00017
APPROACH    0.400      7200.0     6.408   3318.823     1.000       4.00      0.427     221.25     1.931    480.00    0.00089
TAXI-IDLE   0.050       900.0    20.779    205.820     1.000       7.00      2.424      24.01   100.959    105.00    0.02309

                                 TOTAL FOR CYCLE:                            9.546     717.63              1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            13.302
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            5.817
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          0.952


   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     NOX        FUEL    LB NOX/    ENERGY   LB NOX/
             POWER       # TH      RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.050       900.0     0.589    205.820     1.000      19.00      0.186      65.18     2.860    285.00    0.00065
TAKEOFF     1.000     18000.0   132.810   9927.949     1.000       0.70      1.549     115.83    13.377    210.00    0.00738
CLIMBOUT    0.850     15300.0    86.100   7946.180     1.000       2.20      3.157     291.36    10.835    561.00    0.00563
APPROACH    0.400      7200.0    20.685   3318.823     1.000       4.00      1.379     221.25     6.233    480.00    0.00287
TAXI-IDLE   0.050       900.0     0.589    205.820     1.000       7.00      0.069      24.01     2.860    105.00    0.00065

                                 TOTAL FOR CYCLE:                            6.341     717.63              1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             8.835
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            3.864
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         86.080
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DATE:   7/21/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  329    ENGINE TYPE AND MODEL:  JT3D -3B                    SERIAL NUMBER:    P668817

                          RATED THRUST:        18000.

     ENGINE TOTAL TIME:                                    -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          -0. HRS
          N2 COMPRESSOR OVERHAUL:                          -0. HRS
          COMBUSTOR CAN REPLACEMENT:                       -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          -0. HRS
          N1 TURBINE OVERHAUL:                             -0. HRS
          N2 TURBINE OVERHAUL:                             -0. HRS

     FUEL: JP-4                FUEL H/C RATIO:   2.000

OPERATIONAL DATA ***************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   68.00   FINISH   78.00

     ATMOSPHERIC PRESSURE:              START   30.00   FINISH   29.20

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0090

     RELATIVE HUMIDITY:                      -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   8

COMMENTS:

 SMOKE DENSITY IS VON BRAND MEASURE PARTICULATES ARE IN MG/M**3


  CLOCK      TEST          POWER               ENGINE           MEASURED   GAS GEN     CALC      COMPRESSOR    ENGINE      TURBINE
  TIME       MODE     THRUST,LBS  PERCENT       SPEED             FUEL     AIR FLOW     F/A      DISCHARGE    PRESSURE      INLET
                          OR       RATED         RPM              FLOW      LB/SEC                  TEMP        RATIO        TEMP
                         SHP       T.O.      N1         N2        LB/HR                           DEGREES F      EPR      DEGREES F

  925.00     1/ 3      850.00       4     1850.00    5440.00    1080.00     32.40    0.009110      -0.00        1.02        -0.00
  933.00     2/ 1     5535.00      30     4195.00    8260.00    2875.00     93.63    0.008390      -0.00        1.17        -0.00
 1020.00     3/ 2      880.00       4     1375.00    5535.00     950.00     32.71    0.007910      -0.00        1.02        -0.00
 1252.00     4/ 3     9659.00      53     5220.00    8995.00    4745.00    126.49    0.010170      -0.00        1.34        -0.00
 1315.00     5/ 4    11712.00      65     5610.00    9230.00    5835.00    143.34    0.011030      -0.00        1.45        -0.00
 1335.00     6/ 5    13724.00      76     5940.00    9450.00    6885.00    158.54    0.011770      -0.00        1.56        -0.00
 1349.00     7/ 6    15651.00      86     6250.00    9660.00    8050.00    170.96    0.012750      -0.00        1.68        -0.00
 1405.00     8/ 7    17653.00      98     6650.00    9980.00    9820.00    185.61    0.014320      -0.00        1.85        -0.00


  POWER    EXHAUST     EXHAUST        CO         CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS        (WET)         2       (WET)     (WET)       2         X
  RATED      TEMP      PRESSURE      PPMV      (WET)       PPMV      PPMV     (WET)     (WET)
  T.O.    DEGREES F      PSIA                PERCENT V                       PPMV      PPMV

    4       563.00      15.11       696.90      1.31    1425.60      4.10      3.10      7.20     -0.00     17.00      -0.00
   30       650.00      17.12       143.40      1.66      34.50     16.20      4.00     20.20     -0.00     31.00      -0.00
    4       540.00      15.10       464.40      1.35    1233.80      3.60      5.60      9.20     38.00     15.00      -0.00
   53       715.00      19.46        55.20      1.98       4.40     36.60      9.30     45.90     -0.00     40.00      -0.00
   65       770.00      20.97        35.10      2.17       1.90     47.50      9.10     56.60     -0.00     42.00      -0.00
   76       820.00      22.53        24.10      2.51       1.40     61.50     11.30     72.80     -0.00     42.00      24.00
   86       875.00      24.14        17.40      2.53       2.10     60.30      9.30     89.60     -0.00     42.00      24.00
   98       975.00      26.54        12.60      2.81       4.70    118.70     10.10    128.80     -0.00     39.00      22.00


  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    4      116.14    105.72      0.66   2665.23      0.87      1.53    125.43    114.18      0.71   2874.45      0.94      1.65
   30       17.12      2.35      1.56   3104.40      3.56      3.95     49.21      6.76      4.50   8925.15     10.23     11.35
    4      110.29     94.50      1.17   2705.20      0.75      1.93    104.78     89.78      1.11   2569.34      0.72      1.83
   53        5.55      0.25      1.54   3128.13      6.05      7.58     26.34      1.20      7.29  14843.91     28.68     35.97
   65        3.24      0.10      1.37   3132.38      7.17      8.54     18.92      0.58      8.01  18277.41     41.82     49.84
   76        1.93      0.06      1.48   3134.53      8.03      9.50     13.30      0.44     10.16  21581.27     55.28     65.44
   86        1.37      0.09      1.20   3135.33     10.40     11.61     11.05      0.76      9.70  25239.39     83.74     93.44
   98        0.89      0.19      1.18   3135.81     13.85     15.03      8.79      1.88     11.57  30793.69    135.98    147.55


  POWER          CO                CO               THC               NO                NO                NO
 PERCENT                            2                                                    2                 X
  RATED     LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR
  T.O.

    4         147.362          3346.408           134.330            1.106             0.838             1.946
   30           8.890          1617.694             1.222            1.848             0.812             2.051
    4         119.055          2920.383           102.019            0.814             1.266             2.081
   53           2.727          1536.796             0.124            2.973             0.755             3.724
   65           1.616          1560.571             0.050            3.571             0.684             4.255
   76           0.969          1572.520             0.032            4.029             0.740             4.768
   86           0.706          1612.637             0.049            5.351             0.620             5.970
   98           0.498          1744.390             0.106            7.703             0.655             8.359
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    CAL ID NUMBER:  329   ENGINE TYPE AND MODEL: JT3D -3B                 SERIAL NUMBER:   P668817

TEST ORGANIZATION:  PRATT & WHITNEY


   MODE    FRACTIONAL     POWER    EMISSION      FUEL       USAGE     TIME IN      CO          FUEL      LB CO /     ENERGY    LB CO /
             POWER        # TH       RATE        RATE     WT FACTOR    MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR       LB/HR                  MIN.       LBS.         LBS.

TAXI-IDLE    0.050        900.0     80.545     874.719      1.000       19.00    25.506       276.99     92.081     285.00     0.08949
TAKEOFF      1.000      18000.0     14.233    9995.387      1.000        0.70     0.166       116.61      1.424     210.00     0.00079
CLIMBOUT     0.850      15300.0     17.440    7907.129      1.000        2.20     0.639       289.93      2.206     561.00     0.00114
APPROACH     0.400       7200.0     43.745    3775.425      1.000        4.00     2.916       251.69     11.587     480.00     0.00608
TAXI-IDLE    0.050        900.0     80.545     874.719      1.000        7.00     9.397       102.05     92.081     105.00     0.08949

                                 TOTAL FOR CYCLE:                            38.624      1037.28                 1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             37.236
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            23.537
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           0.923


   MODE    FRACTIONAL     POWER    EMISSION      FUEL       USAGE     TIME IN      HC          FUEL      LB HC /     ENERGY    LB HC /
             POWER        # TH       RATE        RATE     WT FACTOR    MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR       LB/HR                  MIN.       LBS.         LBS.

TAXI-IDLE    0.050        900.0     84.342     874.719      1.000       19.00    26.708       276.99     96.422     285.00     0.09371
TAKEOFF      1.000      18000.0      4.178    9995.387      1.000        0.70     0.049       116.61      0.418     210.00     0.00023
CLIMBOUT     0.850      15300.0      3.305    7907.129      1.000        2.20     0.121       289.93      0.418     561.00     0.00022
APPROACH     0.400       7200.0      6.730    3775.425      1.000        4.00     0.449       251.69      1.782     480.00     0.00093
TAXI-IDLE    0.050        900.0     84.342     874.719      1.000        7.00     9.840       102.05     96.422     105.00     0.09371

                                 TOTAL FOR CYCLE:                            37.167      1037.28                 1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             35.831
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            22.649
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           2.708


   MODE    FRACTIONAL     POWER    EMISSION      FUEL       USAGE     TIME IN      NOX         FUEL      LB NOX/     ENERGY    LB NOX/
             POWER        # TH       RATE        RATE     WT FACTOR    MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR       LB/HR                  MIN.       LBS.         LBS.

TAXI-IDLE    0.050        900.0      1.560     874.719      1.000       19.00     0.494       276.99      1.784     285.00     0.00173
TAKEOFF      1.000      18000.0    159.271    9995.387      1.000        0.70     1.858       116.61     15.934     210.00     0.00885
CLIMBOUT     0.850      15300.0     91.570    7907.129      1.000        2.20     3.358       289.93     11.581     561.00     0.00598
APPROACH     0.400       7200.0     19.308    3775.425      1.000        4.00     1.287       251.69      5.114     480.00     0.00268
TAXI-IDLE    0.050        900.0      1.560     874.719      1.000        7.00     0.182       102.05      1.784     105.00     0.00173

                                 TOTAL FOR CYCLE:                             7.179      1037.28                 1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              6.921
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             4.375
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         103.231
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DATE: 8/ 5/71

TEST ORGANIZATION: S W R I TWA

ENGINE SUPPLIER: T W A

ENGINE DATA **

CAL ID NUMBER: 331 ENGINE TYPE AND MODEL: JT3D -3B SERIAL NUMBER: P643434B

RATED THRUST: 18000.

ENGINE TOTAL TIME: 16564. HRS

TIME SINCE HOT SECTION OVERHAUL: 16564. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 16564. HRS
N2 COMPRESSOR OVERHAUL: 16564. HRS
COMBUSTOR CAN REPLACEMENT: 7694. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 16564. HRS
N1 TURBINE OVERHAUL: 16564. HRS
N2 TURBINE OVERHAUL: 16564. HRS

FUEL: JP-4 TF FUEL H/C RATIO: 1.722

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 77.00 FINISH 77.00

ATMOSPHERIC PRESSURE: START 29.14 FINISH 29.12

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0139

RELATIVE HUMIDITY: 63.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 9

COMMENTS:

NO2 DETERMINED BY SUBTRACTION.

ELAPSED TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	6/ 0	8820.00	48	5460.00	9170.00	5120.00	124.40	0.011400	-0.00	1.38	-0.00
4.00	1/ 6	11040.00	61	5840.00	9410.00	6320.00	141.70	0.012400	-0.00	1.50	-0.00
6.00	2/ 1	13310.00	73	6250.00	9680.00	7800.00	158.90	0.013300	-0.00	1.66	-0.00
10.00	3/ 2	15410.00	85	6660.00	9970.00	9490.00	173.20	0.015200	-0.00	1.84	-0.00
13.00	4/ 3	950.00	5	2050.00	5870.00	980.00	30.60	0.009000	-0.00	-0.00	-0.00
16.00	5/ 4	15410.00	85	6640.00	9910.00	9540.00	173.20	0.015300	-0.00	-0.00	-0.00
19.00	7/ 5	7040.00	39	5000.00	8900.00	4050.00	110.00	0.010200	-0.00	-0.00	-0.00
22.00	9/ 7	5000.00	27	4380.00	8480.00	2980.00	89.00	0.009300	-0.00	-0.00	-0.00
24.00	8/ 8	2950.00	16	3490.00	7820.00	1990.00	63.20	0.008700	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO 2 (WET) PPMV	NO x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
48	747.00	5.00	41.00	2.34	50.00	35.00	4.00	39.00	-0.00	-0.00	-0.00
61	806.00	6.50	25.00	2.52	38.00	48.00	2.00	50.00	-0.00	-0.00	-0.00
73	874.00	8.60	19.00	2.70	26.00	64.00	2.00	66.00	-0.00	-0.00	-0.00
85	957.00	10.90	34.00	2.98	24.00	88.00	3.00	91.00	-0.00	-0.00	-0.00
5	552.00	0.30	625.00	1.57	1060.00	2.00	7.00	9.00	-0.00	-0.00	-0.00
85	964.00	11.00	25.00	3.04	27.00	91.00	2.00	93.00	-0.00	-0.00	-0.00
39	687.00	2.20	65.00	2.10	50.00	30.00	1.00	31.00	-0.00	-0.00	-0.00
27	639.00	2.20	92.00	1.91	46.00	22.00	1.00	23.00	-0.00	-0.00	-0.00
16	596.00	1.10	242.00	1.79	104.00	14.00	2.00	16.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
48	3.74	2.48	0.57	3189.04	4.99	5.56	19.10	12.72	2.92	16327.87	25.53	28.45
61	2.10	1.76	0.26	3193.60	6.36	6.62	13.25	11.09	1.67	20183.55	40.19	41.86
73	1.43	1.12	0.25	3196.38	7.92	8.17	11.17	8.75	1.93	24931.73	61.78	63.71
85	2.32	0.94	0.34	3195.49	9.86	10.20	22.02	8.90	3.19	30325.21	93.62	96.81
5	73.26	71.16	1.35	2891.39	0.39	1.73	71.79	69.73	1.32	2833.56	0.38	1.70
85	1.67	1.03	0.22	3196.24	8.90	9.12	10.94	6.77	1.44	20903.43	58.23	59.66
39	6.27	2.76	0.16	3184.27	4.76	4.91	25.41	11.19	0.64	12896.31	15.26	19.90
27	9.75	2.67	0.17	3179.08	3.83	4.00	24.04	7.96	0.52	9473.64	11.41	11.93
16	27.03	6.65	0.37	3141.00	2.57	2.94	53.76	13.24	0.73	6250.58	5.11	5.84

POWER PERCENT RATED T.O.	CO LB/1K*TH-HR	CO 2 LB/1K*TH-HR	THC LB/1K*TH-HR	NO LB/1K*TH-HR	NO 2 LB/1K*TH-HR	NO x LB/1K*TH-HR
48	2.165	1851.233	1.442	2.895	0.331	3.225
61	1.201	1829.220	1.005	3.640	0.152	3.792
73	0.839	1873.162	0.657	4.642	0.145	4.787
85	1.429	1967.892	0.578	6.075	0.207	6.282
5	75.570	2982.598	73.405	0.397	1.390	1.787
85	0.710	1355.485	0.439	3.778	0.093	3.872
39	3.609	1831.862	1.590	2.736	0.091	2.827
27	5.808	1844.729	1.591	2.281	0.104	2.385
16	18.232	2118.842	4.497	1.732	0.247	1.980

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    CAL ID NUMBER:  331   ENGINE TYPE AND MODEL: JT3D -3B                SERIAL NUMBER:  P643434B

TEST ORGANIZATION:  S W R I TWA

  MODE     FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     CO        FUEL     LB CO /     ENERGY   LB CO /
             POWER       # TH       RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050       900.0    62.882     831.320     1.000      19.00    19.913     263.25     75.642    285.00    0.06987
TAKEOFF     1.000     18000.0    19.945   11339.656     1.000       0.70     0.233     132.30      1.759    210.00    0.00111
CLIMBOUT    0.850     15300.0    13.575    9236.012     1.000       2.20     0.498     338.65      1.470    561.00    0.00089
APPROACH    0.400      7200.0    25.659    4184.395     1.000       4.00     1.711     278.96      6.132    480.00    0.00356
TAXI-IDLE   0.050       900.0    62.882     831.320     1.000       7.00     7.336      96.99     75.642    105.00    0.06987

                                 TOTAL FOR CYCLE:                          29.690    1110.15               1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           26.744
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          18.093
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         1.293

  MODE     FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     HC        FUEL     LB HC /     ENERGY   LB HC /
             POWER       # TH       RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050       900.0    61.345     831.320     1.000      19.00    19.426     263.25     73.793    285.00    0.06816
TAKEOFF     1.000     18000.0    11.310   11339.656     1.000       0.70     0.132     132.30      0.997    210.00    0.00063
CLIMBOUT    0.850     15300.0    11.176    9236.012     1.000       2.20     0.410     338.65      1.210    561.00    0.00073
APPROACH    0.400      7200.0    14.401    4184.395     1.000       4.00     0.960     278.96      3.442    480.00    0.00200
TAXI-IDLE   0.050       900.0    61.345     831.320     1.000       7.00     7.157      96.99     73.793    105.00    0.06816

                                 TOTAL FOR CYCLE:                          28.085    1110.15               1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           25.298
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          17.114
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         7.330

  MODE     FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN    NOX        FUEL     LB NOX/     ENERGY   LB NOX/
             POWER       # TH       RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050       900.0     1.201     831.320     1.000      19.00     0.380     263.25      1.445    285.00    0.00133
TAKEOFF     1.000     18000.0   135.739   11339.656     1.000       0.70     1.584     132.30     11.970    210.00    0.00754
CLIMBOUT    0.850     15300.0    86.023    9236.012     1.000       2.20     3.154     338.65      9.314    561.00    0.00562
APPROACH    0.400      7200.0    19.821    4184.395     1.000       4.00     1.321     278.96      4.737    480.00    0.00275
TAXI-IDLE   0.050       900.0     1.201     831.320     1.000       7.00     0.140      96.99      1.445    105.00    0.00133

                                 TOTAL FOR CYCLE:                           6.580    1110.15               1641.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            5.927
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           4.010
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        87.979
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DATE:   8/ 4/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:  337    ENGINE TYPE AND MODEL:  JT3D -3B                 SERIAL NUMBER:   645361

                            RATED THRUST:        18000.

     ENGINE TOTAL TIME:                                12283. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   1968. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       1968. HRS
          N2 COMPRESSOR OVERHAUL:                       1968. HRS
          COMBUSTOR CAN REPLACEMENT:                    1968. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       1968. HRS
          N1 TURBINE OVERHAUL:                          1968. HRS
          N2 TURBINE OVERHAUL:                          1968. HRS

     FUEL: JET - A               FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    85.00    FINISH    90.00

     ATMOSPHERIC PRESSURE:              START    29.08    FINISH    [illegible]

     INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0130

     RELATIVE HUMIDITY:                       42.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  138.00,  FLOW RATE, LITERS/MIN:   16.00

     SAMPLE LINE TRANSPORT TIME, SEC:    0.99

 NUMBER OF TESTS:   6

 COMMENTS:

  H/C CAL ESTIMATED
  SAMPLE LINE TEMP. AVERAGED
  PROBE CONFIG. AND LOCATION SAME AS USED FOR SPEY ON 08-02-71


  CLOCK     TEST          POWER                 ENGINE            MEASURED   GAS GEN      CALC     COMPRESSOR    ENGINE    TURBINE
   TIME     MODE    THRUST,LBS  PERCENT          SPEED              FUEL    AIR FLOW      F/A     DISCHARGE    PRESSURE    INLET
                        OR       RATED            RPM               FLOW     LB/SEC                  TEMP       RATIO       TEMP
                       SHP       T.O.        N1         N2          LB/HR                         DEGREES F      EPR     DEGREES F

  600.00    4/ 0     920.00        5      2020.00    5790.00     1120.00     -0.00   -0.000000      -0.00        1.02       -0.00
  605.00    1/ 4   10850.00       60      5760.00    9360.00     6020.00    157.00   -0.000000      -0.00        1.47       -0.00
  610.00    2/ 1   13450.00       74      6190.00    9660.00     7390.00    175.00   -0.000000      -0.00        1.62       -0.00
  630.00    5/ 2   10600.00       58      5710.00    9320.00     5850.00    155.00   -0.000000      -0.00        1.45       -0.00
  635.00    6/ 5     790.00        4      1840.00    5460.00      890.00     -0.00   -0.000000      -0.00        1.02       -0.00
  645.00    3/ 4   15800.00       87      3700.00    9970.00     9270.00     -0.00   -0.000000      -0.00        1.04       -0.00


  POWER    EXHAUST     EXHAUST          CO        CO       THC       NO       NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS           (WET)       2      (WET)    (WET)      2         X
  RATED     TEMP      PRESSURE         PPMV      (WET)     PPMV     PPMV    (WET)     (WET)
  T.O.    DEGREES F     PSIA                   PERCENT V                    PPMV      PPMV

    5      815.00      14.63          855.00     1.33   1941.00     0.30     6.56      6.80     -0.00      -0.00      -0.00
   60      855.00      20.26           28.70     2.35      6.30    46.80    17.00     63.80      0.62      -0.00      -0.00
   74      920.00      22.27           21.30     2.65      6.30    42.20    18.00     60.20      0.51      -0.00      -0.00
   58      845.00      20.07           31.20     2.35      6.00    45.10    23.00     68.10      0.39      -0.00      -0.00
    4      825.00      14.63          765.00     1.29   1878.00     2.30    10.00     12.30     40.70      -0.00      -0.00
   87     1030.00      25.07           20.00     2.99      8.20   101.20    24.50    125.70      0.46      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    5      106.59    138.72      1.34   2607.69      0.06      1.37    119.50    155.37      1.51   2920.61      1.07      1.56
   60        2.45      0.31      2.38   3151.20      6.56      8.94     14.75      1.85     14.35  18970.20     39.49     53.84
   74        1.61      0.27      2.24   3152.61      5.25      7.49     11.92      2.02     16.54  23297.76     38.78     55.33
   58        2.66      0.29      3.22   3150.50      6.32      9.55     15.59      1.72     18.86  18432.77     36.96     55.84
    4       98.86    138.49      2.12   2619.25      0.49      2.61     87.98    123.70      1.89   2331.13      0.43      2.32
   87        1.34      0.32      2.70   3152.92     11.16     13.86     12.44      2.92     25.04  29227.52    103.41    128.45


  POWER         CO               CO               THC               NO               NO              NO
 PERCENT                           2                                                   2               X
  RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR     LB/1K#TH-HR
  T.O.

    5        129.486         3174.576          168.876            0.075            1.637           1.697
   60          1.359         1768.405            0.171            3.640            1.322           4.962
   74          0.486         1732.175            0.150            2.884            1.230           4.114
   58          1.469         1738.941            0.162            3.489            1.779           5.268
    4        111.371         2450.800          156.586            0.550            2.391           2.941
   87          0.788         1849.843            0.185            6.545            1.585           8.139
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      CAL ID NUMBER:  337   ENGINE TYPE AND MODEL: JT3D -3B               SERIAL NUMBER:  645361
    TEST ORGANIZATION:  U.S. BUREAU OF MINES


       MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE      TIME IN      CO          FUEL      LB CO /     ENERGY     LB CO /
                 POWER        # TH       RATE       RATE      WT FACTOR     MODE       MASS         MASS     1K LB FUEL   # TH-HR    # TH-HR
                                        LB/HR       LB/HR                   MIN.       LBS.         LBS.
    TAXI-IDLE    0.050        900.0   102.025     927.499      1.000       19.00     32.308       293.71     110.000     285.00     0.11336
    TAKEOFF      1.000      18000.0     2.558   10945.402      1.000        0.70      0.030       127.70       0.234     210.00     0.00014
    CLIMBOUT     0.850      15300.0    11.408    9018.008      1.000        2.20      0.418       330.66       1.265     561.00     0.00075
    APPROACH     0.400       7200.0    46.814    4275.543      1.000        4.00      3.121       285.04      10.949     480.00     0.00650
    TAXI-IDLE    0.050        900.0   102.025     927.499      1.000        7.00     11.903       108.21     110.000     105.00     0.11336
                                   TOTAL FOR CYCLE:                                  47.780      1145.31                1641.00
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:                   41.718
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:                  29.116
                                   LBS POLLUTANT/1000K LB TH AT T.O.:                 0.166


       MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE      TIME IN      HC          FUEL      LB HC /     ENERGY     LB HC /
                 POWER        # TH       RATE       RATE      WT FACTOR     MODE       MASS         MASS     1K LB FUEL   # TH-HR    # TH-HR
                                        LB/HR       LB/HR                   MIN.       LBS.         LBS.
    TAXI-IDLE    0.050        900.0   129.850     927.499      1.000       19.00     41.119       293.71     140.000     285.00     0.14428
    TAKEOFF      1.000      18000.0     0.0     10945.402      1.000        0.70      0.0         127.70       0.0       210.00     0.0
    CLIMBOUT     0.850      15300.0     0.0      9018.008      1.000        2.20      0.0         330.66       0.0       561.00     0.0
    APPROACH     0.400       7200.0    18.501    4275.543      1.000        4.00      1.233       285.04       4.327     480.00     0.00257
    TAXI-IDLE    0.050        900.0   129.850     927.499      1.000        7.00     15.149       108.21     140.000     105.00     0.14428
                                   TOTAL FOR CYCLE:                                  57.502      1145.31                1641.00
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:                   50.206
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:                  35.041
                                   LBS POLLUTANT/1000K LB TH AT T.O.:                 0.0


       MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE      TIME IN     NOX          FUEL      LB NOX/     ENERGY     LB NOX/
                 POWER        # TH       RATE       RATE      WT FACTOR     MODE       MASS         MASS     1K LB FUEL   # TH-HR    # TH-HR
                                        LB/HR       LB/HR                   MIN.       LBS.         LBS.
    TAXI-IDLE    0.050        900.0     2.003     927.499      1.000       19.00      0.634       293.71       2.160     285.00     0.00223
    TAKEOFF      1.000      18000.0   167.596   10945.402      1.000        0.70      1.955       127.70      15.312     210.00     0.00931
    CLIMBOUT     0.850      15300.0   112.112    9018.008      1.000        2.20      4.111       330.66      12.432     561.00     0.00733
    APPROACH     0.400       7200.0    24.920    4275.543      1.000        4.00      1.661       285.04       5.829     480.00     0.00346
    TAXI-IDLE    0.050        900.0     2.003     927.499      1.000        7.00      0.234       108.21       2.160     105.00     0.00223
                                   TOTAL FOR CYCLE:                                   8.596      1145.31                1641.00
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:                    7.505
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:                   5.238
                                   LBS POLLUTANT/1000K LB TH AT T.O.:               108.627
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DATE: 8/11/71

TEST ORGANIZATION: S W R I TWA

ENGINE SUPPLIER: T W A

ENGINE DATA **

CAL ID NUMBER: 340 ENGINE TYPE AND MODEL: JT3D -3B SERIAL NUMBER: (TWA2537)

RATED THRUST: 18000.

ENGINE TOTAL TIME: 17359. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	17359. HRS
N2 COMPRESSOR OVERHAUL:	17359. HRS
COMBUSTOR CAN REPLACEMENT:	17359. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	17359. HRS
N1 TURBINE OVERHAUL:	17359. HRS
N2 TURBINE OVERHAUL:	17359. HRS

FUEL: JP-4 TF FUEL H/C RATIO: 2.020

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 83.00 FINISH 83.00

ATMOSPHERIC PRESSURE: START 28.96 FINISH 28.96

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0137

RELATIVE HUMIDITY: 49.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 12

COMMENTS:

NO2 DETERMINED BY SUBTRACTION. MAINTENANCE DATA ARE NOT LOGICAL, BUT ARE LISTED AS GIVEN BY TWA.

ELAPSED TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	6/ 0	8930.00	49	5470.00	9270.00	5100.00	124.00	0.011400	-0.00	1.37	-0.00
7.00	1/ 6	10860.00	60	5850.00	9480.00	6310.00	139.20	0.012600	-0.00	1.50	-0.00
16.00	2/ 1	13000.00	72	6230.00	9770.00	7590.00	154.40	0.013700	-0.00	1.65	-0.00
47.00	3/ 2	15280.00	84	6670.00	10040.00	9440.00	171.30	0.015300	-0.00	1.84	-0.00
52.00	4/ 3	880.00	4	1740.00	5790.00	900.00	29.40	0.008500	-0.00	-0.00	-0.00
57.00	7/ 4	1240.00	6	2330.00	6420.00	1200.00	36.00	0.009300	-0.00	-0.00	-0.00
59.30	8/ 7	1500.00	8	2550.00	6770.00	1340.00	47.70	0.009100	-0.00	-0.00	-0.00
62.00	4/ 8	1750.00	9	2750.00	7070.00	1470.00	44.50	0.009200	-0.00	-0.00	-0.00
64.00	10/ 4	2000.00	11	2920.00	7000.00	1590.00	48.30	0.009100	-0.00	-0.00	-0.00
67.00	11/10	2500.00	13	3220.00	[illegible]	[illegible]	55.90	0.009100	-0.00	-0.00	-0.00
69.30	12/11	4000.00	22	3980.00	[illegible]	[illegible]	72.00	0.009500	-0.00	-0.00	-0.00
74.00	13/12	7000.00	38	5020.00	[illegible]	[illegible]	108.90	0.010400	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
49	765.00	4.80	40.00	2.30	90.00	42.00	1.00	43.00	-0.00	-0.00	-0.00
60	835.00	6.40	28.30	2.54	54.00	52.00	1.00	53.00	-0.00	-0.00	-0.00
72	883.00	8.40	20.00	2.75	16.00	66.00	3.00	69.00	-0.00	-0.00	-0.00
84	997.00	10.90	25.00	3.07	14.00	91.00	3.00	94.00	-0.00	-0.00	-0.00
4	572.00	0.30	743.00	1.73	992.00	3.00	6.00	9.00	-0.00	-0.00	-0.00
6	574.00	0.40	642.00	1.88	688.00	6.00	4.00	10.00	-0.00	-0.00	-0.00
8	583.00	0.50	566.00	1.85	562.00	7.00	3.00	10.00	-0.00	-0.00	-0.00
9	590.00	0.60	527.00	1.87	496.00	7.00	4.00	11.00	-0.00	-0.00	-0.00
11	599.00	0.60	452.00	1.82	360.00	9.00	3.00	12.00	-0.00	-0.00	-0.00
13	617.00	0.90	360.00	1.83	256.00	10.00	4.00	14.00	-0.00	-0.00	-0.00
22	622.00	1.60	162.00	1.94	92.00	14.00	6.00	19.00	-0.00	-0.00	-0.00
38	700.00	3.50	66.00	2.11	56.00	30.00	2.00	32.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
49	3.45	4.44	0.14	3115.63	5.95	6.09	17.59	22.66	0.72	15889.71	30.33	31.06
60	2.19	2.42	0.13	3123.16	6.68	6.81	13.83	15.27	0.81	19707.12	42.18	42.99
72	1.45	0.66	0.36	3129.15	7.85	8.21	10.99	5.04	2.71	23750.21	59.59	62.30
84	1.62	0.52	0.32	3129.27	9.70	10.02	15.31	4.91	3.02	29540.26	91.54	94.56
4	77.84	59.52	1.03	2847.65	0.52	1.55	70.05	53.57	0.93	2562.89	0.46	1.39
6	63.60	39.03	0.65	2926.23	0.98	1.63	76.32	46.84	0.78	3511.47	1.17	1.95
8	57.50	32.70	0.50	2953.18	1.17	1.67	77.05	43.82	0.67	3957.26	1.57	2.24
9	53.28	28.72	0.66	2970.73	1.16	1.83	78.33	42.22	0.98	4366.96	1.71	2.69
11	47.41	21.63	0.52	2999.42	1.55	2.07	75.38	34.39	0.82	4769.07	2.47	3.29
13	37.95	15.46	0.69	3031.21	1.73	2.42	65.83	28.44	1.27	5577.42	3.19	4.46
22	16.49	5.35	1.00	3092.75	2.33	3.17	40.60	13.20	2.47	7639.09	5.76	7.82
38	6.20	3.01	0.30	3115.23	4.63	4.94	25.37	12.33	1.26	12741.29	18.94	20.20

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_x LB/1K#TH-HR
49	1.970	1779.363	2.538	3.397	0.081	3.478
60	1.273	1814.652	1.406	3.884	0.075	3.958
72	0.846	1826.919	0.387	4.584	0.208	4.792
84	1.002	1933.263	0.321	5.991	0.197	6.188
4	79.607	2912.373	60.872	0.528	1.056	1.584
6	61.547	2831.831	37.775	0.945	0.630	1.575
8	51.370	2638.173	29.213	1.044	0.447	1.491
9	44.758	2495.410	24.126	0.977	0.558	1.535
11	37.691	2384.538	17.193	1.233	0.411	1.644
13	27.932	2230.968	11.376	1.274	0.510	1.784
22	10.150	1909.772	3.301	1.441	0.617	1.955
38	3.624	1820.184	1.761	2.705	0.180	2.886

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    CAL ID NUMBER:  340   ENGINE TYPE AND MODEL: JT3D -3B             SERIAL NUMBER:  (TWA2537)

TEST ORGANIZATION:  S W R I TWA


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN      CO        FUEL     LB CO /     ENERGY    LB CO /
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050      900.0    71.805    842.784     1.000      19.00    22.738     266.88     85.200     285.00     0.07978
TAKEOFF     1.000    18000.0    18.151  11409.559     1.000       0.70     0.212     133.11      1.591     210.00     0.00101
CLIMBOUT    0.850    15300.0    16.321   9444.996     1.000       2.20     0.598     346.32      1.728     561.00     0.00107
APPROACH    0.400     7200.0    32.603   4547.926     1.000       4.00     2.174     303.19      7.169     480.00     0.00453
TAXI-IDLE   0.050      900.0    71.805    842.784     1.000       7.00     8.377      98.32     85.200     105.00     0.07978

                                TOTAL FOR CYCLE:                        34.099    1147.83               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:         29.708
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:        20.780
                                LBS POLLUTANT/1000K LB TH AT T.O.:       1.176


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN      HC        FUEL     LB HC /     ENERGY    LB HC /
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050      900.0    50.567    842.784     1.000      19.00    16.013     266.88     60.000     285.00     0.05619
TAKEOFF     1.000    18000.0     3.828  11409.559     1.000       0.70     0.045     133.11      0.335     210.00     0.00021
CLIMBOUT    0.850    15300.0    11.212   9444.996     1.000       2.20     0.411     346.32      1.187     561.00     0.00073
APPROACH    0.400     7200.0    16.660   4547.926     1.000       4.00     1.111     303.19      3.663     480.00     0.00231
TAXI-IDLE   0.050      900.0    50.567    842.784     1.000       7.00     5.899      98.32     60.000     105.00     0.05619

                                TOTAL FOR CYCLE:                        23.479    1147.83               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:         20.455
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:        14.308
                                LBS POLLUTANT/1000K LB TH AT T.O.:       2.481


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     NOX        FUEL     LB NOX/     ENERGY    LB NOX/
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050      900.0     1.259    842.784     1.000      19.00     0.399     266.88      1.493     285.00     0.00140
TAKEOFF     1.000    18000.0   146.407  11409.559     1.000       0.70     1.708     133.11     12.832     210.00     0.00813
CLIMBOUT    0.850    15300.0    95.080   9444.996     1.000       2.20     3.486     346.32     10.067     561.00     0.00621
APPROACH    0.400     7200.0    24.118   4547.926     1.000       4.00     1.608     303.19      5.303     480.00     0.00335
TAXI-IDLE   0.050      900.0     1.259    842.784     1.000       7.00     0.147      98.32      1.493     105.00     0.00140

                                TOTAL FOR CYCLE:                         7.348    1147.83               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:          6.401
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:         4.478
                                LBS POLLUTANT/1000K LB TH AT T.O.:      94.894
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DATE: 8/19/71

TEST ORGANIZATION: PRATT & WHITNEY

ENGINE SUPPLIER: PRATT AND WHITNEY

ENGINE DATA **

CAL ID NUMBER: 358 ENGINE TYPE AND MODEL: JT3D -3B SERIAL NUMBER: P-668820

RATED THRUST: 18000.

ENGINE TOTAL TIME: -0. HRS

TIME SINCE HOT SECTION OVERHAUL: -0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: -0. HRS
N2 COMPRESSOR OVERHAUL: -0. HRS
COMBUSTOR CAN REPLACEMENT: -0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: -0. HRS
N1 TURBINE OVERHAUL: -0. HRS
N2 TURBINE OVERHAUL: -0. HRS

FUEL: JP-4 FUEL H/C RATIO: 2.000

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 74.00 FINISH 79.00

ATMOSPHERIC PRESSURE: START 29.75 FINISH 29.15

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0133

RELATIVE HUMIDITY: -0.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 2.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 7

COMMENTS:

CLOCK TIME	TEST MODE	POWER THRUST, LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1208.00	1/ 0	5000.00	27	4155.00	8245.00	2736.00	91.41	0.008310	-0.00	1.16	-0.00
1029.00	2/ 1	840.00	4	1855.00	5480.00	938.00	29.11	0.008950	-0.00	1.02	-0.00
1259.00	3/ 2	8900.00	49	5215.00	8960.00	4574.00	127.46	0.009970	-0.00	1.34	-0.00
1108.00	4/ 3	10800.00	59	5600.00	9160.00	5606.00	143.97	0.010820	-0.00	1.45	-0.00
1320.00	5/ 4	12750.00	70	5970.00	9420.00	6747.00	160.04	0.011710	-0.00	1.57	-0.00
1131.00	6/ 5	14600.00	81	6290.00	9650.00	7882.00	173.42	0.012630	-0.00	1.69	-0.30
1140.00	7/ 6	16400.00	91	6690.00	9930.00	9397.00	185.74	0.014150	-0.00	1.84	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
27	610.00	17.00	155.70	1.80	19.20	18.40	13.40	31.80	-0.00	-0.00	-0.00
4	555.00	15.07	908.60	1.27	532.20	4.60	4.90	9.50	-0.00	-0.00	-0.00
49	700.00	19.44	60.10	2.19	3.50	36.30	3.20	39.50	-0.00	-0.00	-0.00
59	750.00	20.91	38.80	2.21	1.90	40.80	2.90	43.70	-0.00	-0.00	-0.00
70	805.00	22.57	20.70	2.32	0.20	60.10	0.40	60.50	-0.00	-0.00	-0.00
81	865.00	24.33	17.40	2.75	3.80	73.70	1.40	75.10	-0.00	-0.00	-0.00
91	955.00	26.38	9.10	2.85	3.20	112.10	0.60	112.70	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
27	17.11	1.21	2.42	3107.55	3.32	5.74	46.81	3.31	6.62	8502.25	9.09	15.70
4	128.32	43.05	1.14	2818.04	1.07	2.20	120.36	40.38	1.07	2643.32	1.00	2.07
49	5.46	0.18	0.48	3128.66	5.42	5.90	24.99	0.83	2.19	14310.48	24.80	26.98
59	3.50	0.10	0.43	3131.98	6.04	6.47	19.62	0.55	2.41	17557.86	33.89	36.29
70	1.78	0.01	0.06	3134.92	8.49	8.55	12.01	0.07	0.38	21151.31	57.28	57.66
81	1.26	0.16	0.17	3135.33	6.78	8.95	9.95	1.24	1.32	24712.65	69.24	70.55
91	0.64	0.13	0.07	3136.39	12.90	12.97	5.99	1.21	0.65	29472.67	121.19	121.84

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_X LB/1K#TH-HR
27	9.361	1700.451	0.661	1.817	1.323	3.141
4	143.295	3146.814	48.067	1.192	1.269	2.461
49	2.808	1607.919	0.094	2.786	0.246	3.032
59	1.817	1625.728	0.051	3.138	0.223	3.361
70	0.942	1658.927	0.005	4.493	0.030	4.522
81	0.682	1692.647	0.085	4.742	0.090	4.832
91	0.365	1797.115	0.074	7.390	0.040	7.429

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   CAL ID NUMBER:  358   ENGINE TYPE AND MODEL: JT3D -3B                    SERIAL NUMBER:   P-668820

TEST ORGANIZATION:  PRATT & WHITNEY


  MODE    FRACTIONAL    POWER    EMISSION     FUEL        USAGE     TIME IN       CO         FUEL     LB CO /      ENERGY   LB CO /
            POWER       # TH       RATE       RATE      WT FACTOR    MODE        MASS        MASS    1K LB FUEL   # TH-HR  # TH-HR
                                  LB/HR      LB/HR                   MIN.        LBS.        LBS.

TAXI-IDLE   0.050       900.0   119.588    1040.707      1.000       19.00     37.869       329.56    114.910     285.00    0.13288
TAKEOFF     1.000     18000.0     0.0     10583.215      1.000        0.70      0.0         123.47      0.0       210.00    0.0
CLIMBOUT    0.850     15300.0     8.851    8846.027      1.000        2.20      0.325       324.35      1.001     561.00    0.00058
APPROACH    0.400      7200.0    30.697    3699.899      1.000        4.00      2.046       246.66      8.297     480.00    0.00426
TAXI-IDLE   0.050       900.0   119.588    1040.707      1.000        7.00     13.952       121.42    114.910     105.00    0.13288

                                TOTAL FOR CYCLE:                               54.192      1145.46               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                47.311
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:               33.024
                                LBS POLLUTANT/1000K LB TH AT T.O.:              0.0


  MODE    FRACTIONAL    POWER    EMISSION     FUEL        USAGE     TIME IN       HC         FUEL     LB HC /      ENERGY   LB HC /
            POWER       # TH       RATE       RATE      WT FACTOR    MODE        MASS        MASS    1K LB FUEL   # TH-HR  # TH-HR
                                  LB/HR      LB/HR                   MIN.        LBS.        LBS.

TAXI-IDLE   0.050       900.0    40.454    1040.707      1.000       19.00     12.810       329.56     38.871     285.00    0.04495
TAKEOFF     1.000     18000.0     0.0     10583.215      1.000        0.70      0.0         123.47      0.0       210.00    0.0
CLIMBOUT    0.850     15300.0     0.0      8846.027      1.000        2.20      0.0         324.35      0.0       561.00    0.0
APPROACH    0.400      7200.0     1.746    3699.899      1.000        4.00      0.116       246.66      0.472     480.00    0.00024
TAXI-IDLE   0.050       900.0    40.454    1040.707      1.000        7.00      4.720       121.42     38.871     105.00    0.04495

                                TOTAL FOR CYCLE:                               17.646      1145.46               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                15.405
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:               10.753
                                LBS POLLUTANT/1000K LB TH AT T.O.:              0.0


  MODE    FRACTIONAL    POWER    EMISSION     FUEL        USAGE     TIME IN      NOX         FUEL     LB NOX/      ENERGY   LB NOX/
            POWER       # TH       RATE       RATE      WT FACTOR    MODE        MASS        MASS    1K LB FUEL   # TH-HR  # TH-HR
                                  LB/HR      LB/HR                   MIN.        LBS.        LBS.

TAXI-IDLE   0.050       900.0     2.288    1040.707      1.000       19.00      0.724       329.56      2.198     285.00    0.00254
TAKEOFF     1.000     18000.0   159.101   10583.215      1.000        0.70      1.856       123.47     15.033     210.00    0.00884
CLIMBOUT    0.850     15300.0    98.363    8846.027      1.000        2.20      3.607       324.35     11.119     561.00    0.00643
APPROACH    0.400      7200.0    19.018    3699.899      1.000        4.00      1.268       246.66      5.140     480.00    0.00264
TAXI-IDLE   0.050       900.0     2.288    1040.707      1.000        7.00      0.267       121.42      2.198     105.00    0.00254

                                TOTAL FOR CYCLE:                                7.722      1145.46               1641.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                 6.741
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:                4.706
                                LBS POLLUTANT/1000K LB TH AT T.O.:            103.121
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DATE: 8/20/71

TEST ORGANIZATION: PRATT & WHITNEY

ENGINE SUPPLIER: PRATT AND WHITNEY

ENGINE DATA **

CAL ID NUMBER: 359 ENGINE TYPE AND MODEL: JT3D -3B SERIAL NUMBER: P-668822

RATED THRUST: 18000.

ENGINE TOTAL TIME: -0. HRS

TIME SINCE HOT SECTION OVERHAUL: -0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: -0. HRS
N2 COMPRESSOR OVERHAUL: -0. HRS
COMBUSTOR CAN REPLACEMENT: -0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: -0. HRS
N1 TURBINE OVERHAUL: -0. HRS
N2 TURBINE OVERHAUL: -0. HRS

FUEL: JP-4 FUEL H/C RATIO: 2.000

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 76.00 FINISH 82.00

ATMOSPHERIC PRESSURE: START 29.55 FINISH 28.95

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0145

RELATIVE HUMIDITY: -0.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 2.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 7

COMMENTS:

B/N BURNER CONFIGURATION SMOKE DENSITY IS VON BRAN MEASURE

CLOCK TIME	TEST MODE	POWER THRUST, LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1000.00	1/ 7	5020.00	27	4180.00	8225.00	2772.00	91.78	0.008390	-0.00	1.17	-0.00
1229.00	2/ 1	840.00	4	1860.00	5480.00	951.00	32.29	0.008190	-0.00	1.02	-0.00
1100.00	3/ 2	8770.00	48	5205.00	8950.00	4526.00	125.48	0.010020	-0.00	1.33	-0.00
1120.00	4/ 3	10720.00	59	5610.00	9180.00	5612.00	147.91	0.010540	-0.00	1.48	-0.00
1323.00	5/ 4	12600.00	69	5970.00	9420.00	6703.00	157.80	0.011800	-0.00	1.56	-0.00
1133.00	6/ 5	14500.00	80	6300.00	9655.00	7912.00	171.07	0.012850	-0.00	1.69	-0.00
1153.00	7/ 6	17492.00	97	6730.00	9925.00	9499.00	183.86	0.013450	-0.00	1.85	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO 2 (WET) PPMV	NO X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
27	620.00	16.96	149.20	1.59	19.10	17.60	8.50	26.10	-0.00	27.00	-0.00
4	550.00	15.00	908.50	1.37	244.90	5.30	1.50	6.80	-0.00	10.00	-0.00
48	705.00	19.25	60.40	1.82	8.10	35.00	0.70	35.70	-0.00	36.00	-0.00
59	765.00	21.25	37.00	2.20	2.90	50.50	6.40	56.90	-0.00	37.00	-0.00
69	915.00	22.37	21.00	2.70	2.10	59.30	5.80	65.10	-0.00	38.00	-0.00
80	895.00	24.18	17.40	2.93	5.40	76.90	5.50	82.40	-0.00	36.00	-0.00
97	980.00	26.33	13.60	3.33	5.60	109.50	5.10	114.60	-0.00	36.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
27	18.56	1.36	1.74	3104.88	3.59	5.33	51.40	3.77	4.81	8606.73	9.96	14.77
4	122.15	18.86	0.33	2894.09	1.17	1.50	116.16	17.93	0.32	2752.28	1.11	1.43
48	6.60	0.51	0.13	3125.98	6.28	6.41	29.88	2.30	0.57	14148.18	28.44	29.01
59	3.35	0.15	0.95	3132.06	7.52	8.47	18.81	0.84	5.35	17577.14	42.18	47.52
69	1.55	0.09	0.70	3135.06	7.20	7.90	10.40	0.60	4.72	21014.31	48.25	52.97
80	1.19	0.21	0.62	3135.30	8.60	9.22	9.38	1.67	4.87	24806.52	68.06	72.93
97	0.82	0.20	0.50	3135.97	10.74	11.28	7.74	1.89	4.77	29788.07	102.40	107.17

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO 2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO 2 LB/1K#TH-HR	NO X LB/1K#TH-HR
27	10.239	1714.447	0.751	1.984	0.958	2.942
4	138.786	3276.527	21.350	1.325	0.375	1.700
48	3.407	1613.248	0.262	3.243	0.065	3.308
59	1.755	1639.659	0.079	3.935	0.499	4.433
69	0.826	1667.803	0.047	3.829	0.375	4.204
80	0.647	1710.795	0.115	4.694	0.336	5.030
97	0.443	1702.955	0.108	5.854	0.273	6.127

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    CAL ID NUMBER:  359   ENGINE TYPE AND MODEL: JT3D -3B                SERIAL NUMBER:   P-668822

TEST ORGANIZATION:  PRATT & WHITNEY

   MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     CO        FUEL     LB CO /    ENERGY   LB CO /
             POWER       # TH      RATE      RATE    WT FACTOR   MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                MIN.      LBS.       LBS.

TAXI-IDLE   0.050       900.0  102.838    985.083    1.000      19.00    32.565     311.94   104.395    285.00    0.11426
TAKEOFF     1.000     18000.0    0.0    10226.559    1.000       0.70    0.0        119.31     0.0      210.00    0.0
CLIMBOUT    0.850     15300.0    3.849   8602.055    1.000       2.20    0.141      315.41     0.447    561.00    0.00025
APPROACH    0.400      7200.0   39.066   3803.405    1.000       4.00    2.604      253.56    10.271    480.00    0.00543
TAXI-IDLE   0.050       900.0  102.838    985.083    1.000       7.00   11.998      114.93   104.395    105.00    0.11426

                               TOTAL FOR CYCLE:                         47.309    1115.15              1641.00
                               LBS POLLUTANT/1K LB FUEL/CYCLE:          42.424
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:         28.829
                               LBS POLLUTANT/1000K LB TH AT T.O.:        0.0

   MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     HC        FUEL     LB HC /    ENERGY   LB HC /
             POWER       # TH      RATE      RATE    WT FACTOR   MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                MIN.      LBS.       LBS.

TAXI-IDLE   0.050       900.0   16.463    985.083    1.000      19.00    5.213      311.94    16.713    285.00    0.01829
TAKEOFF     1.000     18000.0    0.728  10226.559    1.000       0.70    0.008      119.31     0.071    210.00    0.00004
CLIMBOUT    0.850     15300.0    0.912   8602.055    1.000       2.20    0.033      315.41     0.106    561.00    0.00006
APPROACH    0.400      7200.0    3.031   3803.405    1.000       4.00    0.202      253.56     0.797    480.00    0.00042
TAXI-IDLE   0.050       900.0   16.463    985.083    1.000       7.00    1.921      114.93    16.713    105.00    0.01829

                               TOTAL FOR CYCLE:                          7.378    1115.15              1641.00
                               LBS POLLUTANT/1K LB FUEL/CYCLE:           6.616
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:          4.496
                               LBS POLLUTANT/1000K LB TH AT T.O.:        0.472

   MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     NOX       FUEL     LB NOX/    ENERGY   LB NOX/
             POWER       # TH      RATE      RATE    WT FACTOR   MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                MIN.      LBS.       LBS.

TAXI-IDLE   0.050       900.0    1.374    985.083    1.000      19.00    0.435      311.94     1.395    285.00    0.00153
TAKEOFF     1.000     18000.0  120.812  10226.559    1.000       0.70    1.409      119.31    11.814    210.00    0.00671
CLIMBOUT    0.850     15300.0   82.910   8602.055    1.000       2.20    3.040      315.41     9.638    561.00    0.00542
APPROACH    0.400      7200.0   21.132   3803.405    1.000       4.00    1.409      253.56     5.556    480.00    0.00294
TAXI-IDLE   0.050       900.0    1.374    985.083    1.000       7.00    0.160      114.93     1.395    105.00    0.00153

                               TOTAL FOR CYCLE:                          6.454    1115.15              1641.00
                               LBS POLLUTANT/1K LB FUEL/CYCLE:           5.787
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:          3.933
                               LBS POLLUTANT/1000K LB TH AT T.O.:       78.304
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DATE:   7/ 6/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ************************************************************************************************************

     CAL ID NUMBER:  129    ENGINE TYPE AND MODEL:  JT3D-7                         SERIAL NUMBER:    678995

                          RATED THRUST:        19000.

     ENGINE TOTAL TIME:                                    0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          0. HRS
          N2 COMPRESSOR OVERHAUL:                          0. HRS
          COMBUSTOR CAN REPLACEMENT:                       0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
          N1 TURBINE OVERHAUL:                             0. HRS
          N2 TURBINE OVERHAUL:                             0. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***********************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   59.00   FINISH   57.20

      ATMOSPHERIC PRESSURE:              START   29.78   FINISH   29.86

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0069

      RELATIVE HUMIDITY:                 65.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    1.50

      SAMPLE LINE TRANSPORT TIME, SEC:    5.00

 NUMBER OF TESTS:   4

 COMMENTS:

  NEW ENGINE - DATA QUESTIONABLE. SAMPLE  LINE BROKEN AFTER TEST.
 PROBE LOCATED 15.25 IN. FROM TAILPIPE


  CLOCK     TEST           POWER              ENGINE         MEASURED   GAS GEN     CALC    COMPRESSOR   ENGINE     TURBINE
  TIME      MODE    THRUST,LBS  PERCENT        SPEED            FUEL    AIR FLOW    F/A     DISCHARGE   PRESSURE     INLET
                        OR       RATED          RPM             FLOW    LB/SEC                 TEMP       RATIO       TEMP
                       SHP       T.O.      N1         N2       LB/HR                        DEGREES F     EPR     DEGREES F

                                                                                                           1.38        -0.00
  1920.00   1/ 0     9925.00      52    5130.00    8936.00    5053.00    -0.00   -0.000000     -0.00       1.54        -0.00
  1925.00   2/ 1    13150.00      69    5634.00    9300.00    6821.00    -0.00   -0.000000     -0.00       1.82        -0.00
  1930.00   3/ 2    17400.00      91    6237.00    9730.00    9437.00    -0.00   -0.000000     -0.00      -0.00        -0.00
  2040.00   4/ 3     1150.00       6    2026.00    5809.00    1162.00    -0.00   -0.000000     -0.00


  POWER    EXHAUST      EXHAUST         CO        CO       THC      NO       NO       NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS          (WET)        2      (WET)    (WET)       2        X
  RATED     TEMP       PRESSURE        PPMV      (WET)     PPMV     PPMV     (WET)    (WET)
  T.O.    DEGREES F      PSIA                  PERCENT V                      PPMV     PPMV

   52       730.40       41.00         70.00      1.52      7.80    23.00    -0.00    29.00     -0.00     -0.00     -0.00
   69       798.90       45.80         50.00      2.62      4.20    59.00    -0.00    63.00     -0.00     -0.00     -0.00
   91       910.40       53.80         35.00      2.97      3.80    92.00    -0.00    95.00     -0.00     -0.00     -0.00
    6       478.40       31.00         75.00      0.17     84.00     1.00    -0.00     1.00     -0.00     -0.00     -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC       NO2       CO2       NO        NOX       CO        HC        NO2       CO2        NO       NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K    LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   52        9.20      0.59     -0.00    3139.82     4.97      6.26     46.50      2.97     -0.00   15865.50    25.10     31.64
   69        3.83      0.18     -0.00    3149.37     7.41      7.92     26.09      1.26     -0.00   21481.88    50.57     54.00
   91        2.36      0.15     -0.00    3151.77    10.21     10.54     22.31      1.39     -0.00   29743.27    96.32     99.46
    6       81.03     51.98     -0.00    2885.97     1.77      1.77     94.16     60.40     -0.00    3353.49     2.06      2.06


  POWER          CO               CO              THC              NO              NO              NO
 PERCENT                            2                                                 2               X
  RATED     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR
  T.O.

   52          4.685         1598.540           0.299           2.529          -0.000           3.188
   69          1.984         1633.603           0.095           3.846          -0.000           4.106
   91          1.282         1709.384           0.080           5.535          -0.000           5.716
    6         81.879         2916.081          52.521           1.793          -0.000           1.793
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     CAL ID NUMBER:  129   ENGINE TYPE AND MODEL: JT3D-7                SERIAL NUMBER:   678995

TEST ORGANIZATION:  UNITED/EPA

   MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE      TIME IN      CO          FUEL     LB CO /     ENERGY   LB CO /
             POWER        # TH       RATE       RATE      WT FACTOR     MODE       MASS         MASS   1K LB FUEL   # TH-HR  # TH-HR
                                    LB/HR      LB/HR                    MIN.       LBS.         LBS.

TAXI-IDLE   0.050         950.0  120.410     829.864      1.000        19.00     38.130       262.79   145.096     300.83    0.12675
TAKEOFF     1.000       19000.0   24.053   10370.813      1.000         0.70      0.281       120.99     2.319     221.67    0.00127
CLIMBOUT    0.850       16150.0   18.772    8655.176      1.000         2.20      0.688       317.36     2.169     592.17    0.00116
APPROACH    0.400        7600.0   50.786    4216.137      1.000         4.00      3.386       281.08    12.046     506.67    0.00668
TAXI-IDLE   0.050         950.0  120.410     829.864      1.000         7.00     14.048        96.82   145.096     110.83    0.12675

                                TOTAL FOR CYCLE:                                56.532      1079.03              1732.17
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                 52.392
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:                32.637
                                LBS POLLUTANT/1000K LB TH AT T.O.:               1.477


   MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE      TIME IN      HC          FUEL     LB HC /     ENERGY   LB HC /
             POWER        # TH       RATE       RATE      WT FACTOR     MODE       MASS         MASS   1K LB FUEL   # TH-HR  # TH-HR
                                    LB/HR      LB/HR                    MIN.       LBS.         LBS.

TAXI-IDLE   0.050         950.0   92.377     829.864      1.000        19.00     29.253       262.79   111.316     300.83    0.09724
TAKEOFF  [illegible]    19000.0    0.0     10370.813      1.000         0.70      0.0         120.99     0.0       221.67    0.0
CLIMBOUT    0.850       16150.0    0.0      8655.176      1.000         2.20      0.0         317.36     0.0       592.17    0.0
APPROACH    0.400        7600.0    3.526    4216.137      1.000         4.00      0.235       281.08     0.836     506.67    0.00046
TAXI-IDLE   0.050         950.0   92.377     829.864      1.000         7.00     10.777        96.82   111.316     110.83    0.09724

                                TOTAL FOR CYCLE:                                40.265      1079.03              1732.17
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                 37.316
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:                23.245
                                LBS POLLUTANT/1000K LB TH AT T.O.:               0.0


   MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE      TIME IN      NOX         FUEL     LB NOX/     ENERGY   LB NOX/
             POWER        # TH       RATE       RATE      WT FACTOR     MODE       MASS         MASS   1K LB FUEL   # TH-HR  # TH-HR
                                    LB/HR      LB/HR                    MIN.       LBS.         LBS.

TAXI-IDLE   0.050         950.0    1.106     829.864      1.000        19.00      0.350       262.79     1.333     300.83    0.00116
TAKEOFF     1.000       19000.0  118.764   10370.813      1.000         0.70      1.386       120.99    11.452     221.67    0.00625
CLIMBOUT    0.850       16150.0   83.489    8655.176      1.000         2.20      3.061       317.36     9.646     592.17    0.00517
APPROACH    0.400        7600.0   21.733    4216.137      1.000         4.00      1.449       281.08     5.155     506.67    0.00286
TAXI-IDLE   0.050         950.0    1.106     829.864      1.000         7.00      0.129        96.82     1.333     110.83    0.00116

                                TOTAL FOR CYCLE:                                 6.375      1079.03              1732.17
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                  5.908
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:                 3.680
                                LBS POLLUTANT/1000K LB TH AT T.O.:              72.926
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DATE:   7/19/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ********************************************************************************************************

    CAL ID NUMBER:  134    ENGINE TYPE AND MODEL:  JT3D-7                    SERIAL NUMBER:    671261

                        RATED THRUST:        19000.

     ENGINE TOTAL TIME:                              6207. HRS

     TIME SINCE HOT SECTION OVERHAUL:                6207. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                    6207. HRS
          N2 COMPRESSOR OVERHAUL:                    6207. HRS
          COMBUSTOR CAN REPLACEMENT:                    0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                       6207. HRS
          N2 TURBINE OVERHAUL:                       6207. HRS

     FUEL: JET - A             FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   72.50   FINISH   68.00

     ATMOSPHERIC PRESSURE:              START   29.84   FINISH   29.90

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0102

     RELATIVE HUMIDITY:                      58.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:     5.00

     SAMPLE LINE TRANSPORT TIME, SEC:    5.00

 NUMBER OF TESTS:   4

 COMMENTS:

  EXHAUST GAS PRESSURE IN INCHES HG
  ALL BY-PASS AIR IS DUCTED AND NOT MIXED WITH EXHAUST.
 REPAIR ENGINE - METAL IN OIL.
 PROBE LOCATED 15.25 IN. FROM TAILPIPE.


  CLOCK      TEST          POWER                  ENGINE             MEASURED     GAS GEN      CALC      COMPRESSOR     ENGINE      TURBINE
  TIME       MODE    THRUST,LBS  PERCENT          SPEED                FUEL      AIR FLOW      F/A       DISCHARGE     PRESSURE      INLET
                         OR       RATED            RPM                 FLOW       LB/SEC                    TEMP         RATIO        TEMP
                        SHP       T.O.       -N1          N2           LB/HR                             DEGREES F        EPR       DEGREES F

 1230.00     1/ 0    10000.00       52     5258.00    9150.00       5440.00      -0.00    -0.000000       -0.00         1.36         -0.00
 1245.00     2/ 1    14076.00       74     5864.00    9603.00       7696.00      -0.00    -0.000000       -0.00         1.58         -0.00
 1250.00     3/ 2    17450.00       91     6388.00    9944.00       9873.00      -0.00    -0.000000       -0.00         1.82         -0.00
 1422.00     4/ 3     1000.00        5     1955.00    5824.00       1143.00      -0.00    -0.000000       -0.00        -0.00         -0.00


  POWER     EXHAUST       EXHAUST           CO          CO          THC        NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
 PERCENT      GAS           GAS            (WET)         2          (WET)     (WET)        2           X
  RATED      TEMP        PRESSURE          PPMV        (WET)        PPMV      PPMV       (WET)       (WET)
  T.O.    DEGREES F        PSIA                      PERCENT V                           PPMV        PPMV

   52       761.00        40.70            80.00        2.35        0.84      38.00      -0.00       42.00     -0.00       -0.00       -0.00
   74       865.40        47.20            50.00        2.78        1.50      73.60      -0.00       76.00     -0.00       -0.00       -0.00
   91       962.60        54.10            10.00        3.15        1.50     105.60      -0.00      106.00     -0.00       -0.00       -0.00
    5       546.80        30.70           880.00        1.42     1200.00      10.00      -0.00       11.00     -0.00       -0.00       -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   52        6.91      0.04     -0.00   3145.07      5.32      5.88     37.07      0.22     -0.00  17109.18     28.92     31.97
   74        3.61      0.06     -0.00   3150.05      8.72      9.00     27.75      0.48     -0.00  24242.81     67.10     69.28
   91        0.64      0.05     -0.00   3154.74     11.06     11.10      6.29      0.54     -0.00  31146.73    109.16    109.57
    5      108.57     84.79     -0.00   2752.68      2.03      2.23    124.10     96.97     -0.00   3146.31      2.32      2.55


  POWER          CO               CO               THC               NO               NO              NO
 PERCENT                           2                                                   2               X
  RATED     LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR     LB/1K*TH-HR
  T.O.

   52           3.707          1710.918            0.022            2.892           -0.000           3.197
   74           1.971          1722.280            0.034            4.767           -0.000           4.922
   91           0.361          1784.913            0.031            6.255           -0.000           6.279
    5         124.096          3146.314           96.918            2.316           -0.000           2.548
    CAL ID NUMBER:  134   ENGINE TYPE AND MODEL: JT3D-7               SERIAL NUMBER:   671261

TEST ORGANIZATION:  UNITED/EPA


  MODE   FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN      CO        FUEL     LB CO /     ENERGY   LB CO /
            POWER       # TH     RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.050      950.0  114.360   1015.865     1.000      19.00    36.214     321.69    112.574     300.83    0.12038
TAKEOFF     1.000    19000.0    5.987  11015.152     1.000       0.70     0.070     128.51      0.544     221.67    0.00032
CLIMBOUT    0.850    16150.0   20.751   8966.469     1.000       2.20     0.761     328.77      2.314     592.17    0.00128
APPROACH    0.400     7600.0   45.167   4501.012     1.000       4.00     3.011     300.07     10.035     506.67    0.00594
TAXI-IDLE   0.050      950.0  114.360   1015.865     1.000       7.00    13.342     118.52    112.574     110.83    0.12038

                              TOTAL FOR CYCLE:                         53.398    1197.56               1732.17
                              LBS POLLUTANT/1K LB FUEL/CYCLE:          44.589
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:         30.827
                              LBS POLLUTANT/1000K LB TH AT T.O.:        0.368


  MODE   FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN      HC        FUEL     LB HC /     ENERGY   LB HC /
            POWER       # TH     RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.050      950.0  101.818   1015.865     1.000      19.00    32.242     321.69    100.228     300.83    0.10718
TAKEOFF     1.000    19000.0    5.468  11015.152     1.000       0.70     0.064     128.51      0.496     221.67    0.00029
CLIMBOUT    0.850    16150.0    3.687   8966.469     1.000       2.20     0.135     328.77      0.411     592.17    0.00023
APPROACH    0.400     7600.0    2.189   4501.012     1.000       4.00     0.146     300.07      0.486     506.67    0.00029
TAXI-IDLE   0.050      950.0  101.818   1015.865     1.000       7.00    11.879     118.52    100.228     110.83    0.10718

                              TOTAL FOR CYCLE:                         44.466    1197.56               1732.17
                              LBS POLLUTANT/1K LB FUEL/CYCLE:          37.131
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:         25.671
                              LBS POLLUTANT/1000K LB TH AT T.O.:        3.357


  MODE   FRACTIONAL    POWER   EMISSION     FUEL       USAGE    TIME IN     NOX        FUEL     LB NOX/     ENERGY   LB NOX/
            POWER       # TH     RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.050      950.0    1.789   1015.865     1.000      19.00     0.566     321.69      1.761     300.83    0.00188
TAKEOFF     1.000    19000.0  140.433  11015.152     1.000       0.70     1.638     128.51     12.749     221.67    0.00739
CLIMBOUT    0.850    16150.0   91.866   8966.469     1.000       2.20     3.368     328.77     10.245     592.17    0.00569
APPROACH    0.400     7600.0   17.936   4501.012     1.000       4.00     1.196     300.07      3.985     506.67    0.00236
TAXI-IDLE   0.050      950.0    1.789   1015.865     1.000       7.00     0.209     118.52      1.761     110.83    0.00188

                              TOTAL FOR CYCLE:                          6.978    1197.56               1732.17
                              LBS POLLUTANT/1K LB FUEL/CYCLE:           5.827
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:          4.028
                              LBS POLLUTANT/1000K LB TH AT T.O.:       86.231
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DATE:   7/16/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:  115    ENGINE TYPE AND MODEL:  JT4A -11                    SERIAL NUMBER:   (TWA2233)

                        RATED THRUST:         17500.

     ENGINE TOTAL TIME:                              26795. HRS

     TIME SINCE HOT SECTION OVERHAUL:                 2993. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                    13286. HRS
          N2 COMPRESSOR OVERHAUL:                    13286. HRS
          COMBUSTOR CAN REPLACEMENT:                  2993. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    13286. HRS
          N1 TURBINE OVERHAUL:                       13286. HRS
          N2 TURBINE OVERHAUL:                       13286. HRS

     FUEL: JP-4 TF               FUEL H/C RATIO:   2.020

OPERATIONAL DATA *******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   89.00   FINISH   89.00

     ATMOSPHERIC PRESSURE:              START   28.87   FINISH   28.87

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0153

     RELATIVE HUMIDITY:                      50.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

 F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN. NO2
 DETERMINED BY SUBTRACTION.


ELAPSED    TEST           POWER               ENGINE            MEASURED    GAS GEN      CALC      COMPRESSOR    ENGINE      TURBINE
 TIME      MODE    THRUST,LBS  PERCENT        SPEED               FUEL      AIR FLOW     F/A       DISCHARGE    PRESSURE      INLET
                       OR       RATED          RPM                FLOW      LB/SEC                   TEMP        RATIO        TEMP
                      SHP       T.O.       N1          N2         LB/HR                            DEGREES F      EPR       DEGREES F

   0.0     1/ 0    10020.00       57     5785.00    8440.00     8580.00    205.20    0.011600      -0.00       -0.00        -0.00
   5.00    2/ 1    12280.00       70     6140.00    8730.00    10670.00    220.80    0.013400      -0.00       -0.00        -0.00
  10.00    3/ 2    13700.00       78     6450.00    8930.00    12200.00    231.00    0.014700      -0.00       -0.00        -0.00
  13.00    4/ 3      580.00        3     2115.00    5250.00     1360.00     59.00    0.006400      -0.00       -0.00        -0.00
  17.00    5/ 4    12600.00       71     6130.00    8750.00    11110.00    220.20    0.014000      -0.00       -0.00        -0.00


 POWER    EXHAUST      EXHAUST         CO         CO        THC       NO        NO         NO      ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS          GAS          (WET)        2       (WET)     (WET)       2          X
 RATED     TEMP       PRESSURE        PPMV       (WET)     PPMV      PPMV      (WET)      (WET)
 T.O.    DEGREES F      PSIA                   PERCENT V                       PPMV       PPMV

  57       977.00       13.70         22.00      2.43      1.00     54.00      3.00      57.00     -0.00      -0.00      -0.00
  70      1107.00       17.20         19.00      2.76      0.0      75.00      2.00      77.00     -0.00      -0.00      -0.00
  78      1194.00       18.90         17.00      2.82      0.0      95.00      2.00      97.00     -0.00      -0.00      -0.00
   3       623.00        0.60        453.00      1.25    800.00      3.00      5.00       8.00     -0.00      -0.00      -0.00
  71      1121.00       17.90         16.00      2.69      2.00     76.00      2.00      78.00     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  57        1.80      0.05      0.40   3130.28      7.27      7.68     15.48      0.40      3.47  26857.79     62.39     65.86
  70        1.37      0.0       0.24   3131.09      8.89      9.13     14.64      0.0       2.53  33408.69     94.91     97.44
  78        1.20      0.0       0.23   3131.35     11.03     11.26     14.66      0.0       2.83  38202.51    134.54    137.37
   3       65.69     66.43      1.19   2847.78      0.71      1.91     89.33     90.35      1.62   3872.98      0.97      2.59
  71        1.19      0.08      0.24   3131.15      9.25      9.49     13.17      0.94      2.70  34787.03    102.75    105.45


 POWER        CO               CO               THC              NO               NO               NO
PERCENT                         2                                                  2                X
 RATED    LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
 T.O.

  57          1.544         2690.418            0.040            6.227            0.346            6.573
  70          1.192         2720.576            0.0              7.729            0.206            7.935
  78          1.070         2789.505            0.0              9.820            0.207           10.027
   3        154.017         6677.555          155.777            1.675            2.792            4.468
  71          1.045         2760.875            0.075            8.154            0.215            8.369
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    CAL ID NUMBER:  115   ENGINE TYPE AND MODEL: JT4A -11             SERIAL NUMBER:  (TWA2233)

TEST ORGANIZATION:  S W R I TWA


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL      LB CO /     ENERGY    LB CO /
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS     1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.050      875.0    27.930   1448.223     1.000       19.00     8.844      458.60      19.285     277.08     0.03192
TAKEOFF     1.000    17500.0    10.583  15554.047     1.000        0.70     0.123      181.46       0.680     204.17     0.00060
CLIMBOUT    0.850    14875.0    11.730  13161.859     1.000        2.20     0.430      482.60       0.891     545.42     0.00079
APPROACH    0.400     7000.0     9.054   5730.918     1.000        4.00     0.604      382.06       1.580     466.67     0.00129
TAXI-IDLE   0.050      875.0    27.930   1448.223     1.000        7.00     3.258      168.96      19.285     102.08     0.03192

                                TOTAL FOR CYCLE:                           13.260     1673.69                 1595.42
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             7.923
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:            8.311
                                LBS POLLUTANT/1000K LB TH AT T.O.:          0.706


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL      LB HC /     ENERGY    LB HC /
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS     1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.050      875.0    51.016   1448.223     1.000       19.00    16.155      458.60      35.226     277.08     0.05830
TAKEOFF     1.000    17500.0     0.0    15554.047     1.000        0.70     0.0        181.46       0.0       204.17     0.0
CLIMBOUT    0.850    14875.0     0.0    13161.859     1.000        2.20     0.0        482.60       0.0       545.42     0.0
APPROACH    0.400     7000.0     0.802   5730.918     1.000        4.00     0.053      382.06       0.140     466.67     0.00011
TAXI-IDLE   0.050      875.0    51.016   1448.223     1.000        7.00     5.952      168.96      35.226     102.08     0.05830

                                TOTAL FOR CYCLE:                           22.160     1673.69                 1595.42
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            13.240
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           13.890
                                LBS POLLUTANT/1000K LB TH AT T.O.:          0.0


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX         FUEL      LB NOX/     ENERGY    LB NOX/
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS     1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.050      875.0     3.022   1448.223     1.000       19.00     0.957      458.60       2.087     277.08     0.00345
TAKEOFF     1.000    17500.0   289.474  15554.047     1.000        0.70     3.377      181.46      18.611     204.17     0.01654
CLIMBOUT    0.850    14875.0   175.049  13161.859     1.000        2.20     6.418      482.60      13.300     545.42     0.01177
APPROACH    0.400     7000.0    34.168   5730.918     1.000        4.00     2.278      382.06       5.962     466.67     0.00488
TAXI-IDLE   0.050      875.0     3.022   1448.223     1.000        7.00     0.353      168.96       2.087     102.08     0.00345

                                TOTAL FOR CYCLE:                           13.383     1673.69                 1595.42
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             7.996
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:            8.389
                                LBS POLLUTANT/1000K LB TH AT T.O.:        192.983
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DATE:   7/19/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  118    ENGINE TYPE AND MODEL:  JT4A -11                        SERIAL NUMBER:  611087

                       RATED THRUST:        17500.

     ENGINE TOTAL TIME:                              22911. HRS

     TIME SINCE HOT SECTION OVERHAUL:                10505. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                    10505. HRS
          N2 COMPRESSOR OVERHAUL:                    10505. HRS
          COMBUSTOR CAN REPLACEMENT:                 10505. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    10505. HRS
          N1 TURBINE OVERHAUL:                       10505. HRS
          N2 TURBINE OVERHAUL:                       10505. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA *****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   73.00   FINISH   73.00

     ATMOSPHERIC PRESSURE:              START   28.97   FINISH   28.98

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0093

     RELATIVE HUMIDITY:                     50.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

 F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
 DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS COMBUSTOR CANS.


 ELAPSED    TEST          POWER                  ENGINE           MEASURED    GAS GEN      CALC    COMPRESSOR    ENGINE      TURBINE
  TIME      MODE    THRUST,LBS  PERCENT          SPEED              FUEL      AIR FLOW     F/A     DISCHARGE    PRESSURE      INLET
                        OR       RATED            RPM               FLOW      LB/SEC                 TEMP        RATIO        TEMP
                       SHP       T.O.        N1          N2         LB/HR                         DEGREES F      EPR       DEGREES F

   0.0      1/ 0    9980.00        57     5670.00     8310.00     8280.00    206.80    0.011100     -0.00       -0.00        -0.00
  11.00     2/ 1   12100.00        69     6020.00     8630.00    10350.00    223.00    0.012900     -0.00       -0.00        -0.00
  21.00     3/ 2   14460.00        82     6520.00     9000.00    12860.00    238.80    0.015000     -0.00       -0.00        -0.00
  24.00     4/ 3     660.00         3     2240.00     5410.00     1250.00     54.30    0.006400     -0.00       -0.00        -0.00
  30.30     5/ 4   13240.00        75     6220.00     8750.00    11400.00    230.60    0.013700     -0.00       -0.00        -0.00


  POWER     EXHAUST     EXHAUST         CO         CO        THC       NO        NO         NO      ALDEHYDES   SMOKE   PARTICULATES
 PERCENT      GAS         GAS          (WET)        2       (WET)    (WET)        2          X
  RATED      TEMP      PRESSURE        PPMV       (WET)     PPMV      PPMV      (WET)      (WET)
  T.O.     DEGREES F     PSIA                   PERCENT V                      PPMV       PPMV

   57       905.00      13.90         29.00       2.18      1.00     47.00      5.00      52.00     -0.00      -0.00      -0.00
   69      1040.00      17.20         25.00       2.53      0.0      65.00      5.00      70.00     -0.00      -0.00      -0.00
   82      1201.00      20.80         25.00       2.94      0.0      95.00      5.00     100.00     -0.00      -0.00      -0.00
    3       498.00       0.70        384.00       1.19    735.00      2.00      6.00       8.00     -0.00      -0.00      -0.00
   75      1108.00      18.90         33.00       2.71      0.0      76.00      5.00      81.00     -0.00      -0.00      -0.00


  POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
  RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   57        2.65       0.05       0.75    3128.94       7.05       7.80      21.93       0.43       6.21   25907.61      58.39      64.60
   69        1.97       0.0        0.65    3130.15       8.41       9.05      20.37       0.0        6.69   32397.04      87.01      93.71
   82        1.59       0.0        0.56    3130.58      10.58      11.13      21.79       0.0        7.16   40259.24     136.00     143.15
    3       58.82      64.48       1.51    2863.94       0.50       2.01      73.52      80.60       1.89    3579.92       0.63       2.52
   75        2.43       0.0        0.60    3129.43       9.17       9.78      27.65       0.0        6.88   35675.49     104.59     111.47


  POWER          CO               CO               THC               NO                NO                NO
 PERCENT                            2                                                    2                 X
  RATED     LB/1K#TH-HR      LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
  T.O.

   57          2.198          2595.953            0.043             5.851             0.622             6.473
   69          1.684          2677.441            0.0               7.191             0.553             7.744
   82          1.507          2784.180            0.0               9.405             0.495             9.900
    3        111.398          5424.121          122.117             0.953             2.859             3.812
   75          2.088          2694.524            0.0               7.900             0.520             8.419
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    CAL ID NUMBER: 118   ENGINE TYPE AND MODEL: JT4A -11              SERIAL NUMBER: 611087

TEST ORGANIZATION:  S W R I TWA


  MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     CO       FUEL     LB CO /    ENERGY   LB CO /
             POWER      # TH      RATE      RATE    WT FACTOR    MODE     MASS      MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                 MIN.     LBS.      LBS.

TAXI-IDLE   0.050      875.0    60.002   1431.050    1.000      19.00   19.001    453.17    41.929    277.08    0.06857
TAKEOFF     1.000    17500.0    18.521  16081.234    1.000       0.70    0.216    187.61     1.152    204.17    0.00106
CLIMBOUT    0.850    14875.0    19.443  13324.449    1.000       2.20    0.713    488.56     1.459    545.42    0.00131
APPROACH    0.400     7000.0    18.325   6308.168    1.000       4.00    1.222    420.54     2.905    466.67    0.00262
TAXI-IDLE   0.050      875.0    60.002   1431.050    1.000       7.00    7.000    166.96    41.929    102.08    0.06857

                               TOTAL FOR CYCLE:                        28.191   1716.84              1595.42
                               LBS POLLUTANT/1K LB FUEL/CYCLE:         16.397
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:        17.645
                               LBS POLLUTANT/1000K LB TH AT T.O.:       1.235


  MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     HC       FUEL     LB HC /    ENERGY   LB HC /
             POWER      # TH      RATE      RATE    WT FACTOR    MODE     MASS      MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                 MIN.     LBS.      LBS.

TAXI-IDLE   0.050      875.0    76.838   1431.050    1.000      19.00   24.332    453.17    53.693    277.08    0.08781
TAKEOFF     1.000    17500.0     0.0    16081.234    1.000       0.70    0.0      187.61     0.0      204.17    0.0
CLIMBOUT    0.850    14875.0     0.0    13324.449    1.000       2.20    0.0      488.56     0.0      545.42    0.0
APPROACH    0.400     7000.0     1.668   6308.168    1.000       4.00    0.111    420.54     0.264    466.67    0.00024
TAXI-IDLE   0.050      875.0    76.838   1431.050    1.000       7.00    8.964    166.96    53.693    102.08    0.08781

                               TOTAL FOR CYCLE:                        33.408   1716.84              1595.42
                               LBS POLLUTANT/1K LB FUEL/CYCLE:         19.459
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:        20.940
                               LBS POLLUTANT/1000K LB TH AT T.O.:       0.0


  MODE    FRACTIONAL    POWER   EMISSION    FJEL      USAGE    TIME IN     NOX      FUEL     LB NOX/    ENERGY   LB NOX/
             POWER      # TH      RATE      RATE    WT FACTOR    MODE     MASS      MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                 MIN.     LBS.      LBS.

TAXI-IDLE   0.050      875.0     3.054   1431.050    1.000      19.00    0.967    453.17     2.134    277.08    0.00349
TAKEOFF     1.000    17500.0   251.460  16081.234    1.000       0.70    2.934    187.61    15.637    204.17    0.01437
CLIMBOUT    0.850    14875.0   155.094  13324.449    1.000       2.20    5.687    488.56    11.640    545.42    0.01043
APPROACH    0.400     7000.0    38.707   6308.168    1.000       4.00    2.580    420.54     6.136    466.67    0.00553
TAXI-IDLE   0.050      875.0     3.054   1431.050    1.000       7.00    0.356    166.96     2.134    102.08    0.00349

                               TOTAL FOR CYCLE:                        12.524   1716.84              1595.42
                               LBS POLLUTANT/1K LB FUEL/CYCLE:          7.295
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:         7.850
                               LBS POLLUTANT/1000K LB TH AT T.O.:     167.640
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DATE:   7/30/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ****************************************************************************************************************
     CAL ID NUMBER:  289    ENGINE TYPE AND MODEL:  JT4A -11                          SERIAL NUMBER:   P610670B

                         RATED THRUST:         17500.

     ENGINE TOTAL TIME:                         26595. HRS

     TIME SINCE HOT SECTION OVERHAUL:               0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                7494. HRS
          N2 COMPRESSOR OVERHAUL:                7494. HRS
          COMBUSTOR CAN REPLACEMENT:             7494. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:  3033. HRS
          N1 TURBINE OVERHAUL:                   7494. HRS
          N2 TURBINE OVERHAUL:                      0. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA *********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   66.00   FINISH   67.00

     ATMOSPHERIC PRESSURE:              START   29.09   FINISH   29.09

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0080

     RELATIVE HUMIDITY:                   50.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, CEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TE[illegible]   5

 COMMENTS:

  NO2 DETERMINED BY SUBTRACTION.


 ELAPSED    TEST          POWER             ENGINE          MEASURED   GAS GEN     CALC    COMPRESSOR    ENGINE     TURBINE
  TIME      MODE    THRUST,LBS  PERCENT      SPEED             FUEL    AIR FLOW     F/A    DISCHARGE    PRESSURE     INLET
                        OR       RATED        RPM              FLOW    LB/SEC                TEMP        RATIO       TEMP
                       SHP       T.O.      N1        N2        LB/HR                       DEGREES F      EPR      DEGREES F

   0.0      1/ 0     9720.00      55     5580.00   8170.00    8050.00   205.70   0.010900     -0.00        2.01        -0.00
  12.30     2/ 1    11500.00      65     5840.00   8400.00    9530.00   218.80   0.012100     -0.00        2.22        -0.00
  21.10     3/ 2    14620.00      83     6450.00   8830.00   12920.00   240.50   0.014900     -0.00        2.61        -0.00
  24.00     4/ 3      620.00       3     2240.00   5210.00    1300.00    61.30   0.005900     -0.00       -0.00        -0.00
  31.50     5/ 4    14000.00      79     6280.00   8690.00   12200.00   236.70   0.014300     -0.00       -0.00        -0.00


 POWER    EXHAUST     EXHAUST        CO        CO        THC       NO        NO        NO     ALDEHYDES   SHOKE   PARTICULATES
 PERCENT    GAS         GAS         (WET)       2       (WET)     (WET)       2         X
 RATED      TEMP      PRESSURE      PPMV      (WET)      PPMV      PPMV     (WET)     (WET)
 T.O.    DEGREES F      PSIA                PERCENT V                       PPMV      PPMV

   55      840.33      13.60       32.00      2.22       0.0      51.00      4.00     55.00     -0.00     -0.00      -0.00
   65      977.00      16.40       29.00      2.46       0.0      64.00      4.00     68.00     -0.00     -0.00      -0.00
   83     1184.00      21.20       26.00      3.00       0.0     103.00      3.00    106.00     -0.00     -0.00      -0.00
    3      543.00       0.60      412.00      1.22     850.00      3.00      6.00      9.00     -0.00     -0.00      -0.00
   79     1137.00      20.30       29.00      2.88       1.00     90.00      4.00     94.00     -0.00     -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   55       2.47      0.0       0.59    3128.73     7.51      8.10     23.11      0.0       4.74   25186.29    60.49     65.23
   65       2.35      0.0       0.53    3129.55     8.51      9.04     22.38      0.0       5.07   29824.63    81.12     86.18
   83       1.74      0.0       0.33    3130.51    11.24     11.56     22.31      0.0       4.23   40446.42   145.17    149.40
    3      61.03     72.11      1.46    2839.52     0.73      2.19     79.34     93.75      1.90    3691.37     0.95      2.85
   79       2.01      0.04      0.45    3129.98    10.23     10.68     24.47      0.48      5.54   38185.77   124.75    130.29


 POWER          CO               CO               THC              NO               NO               NO
 PERCENT                          2                                                  2                X
 RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
 T.O.

   55          2.377         2591.192            0.0              6.223            0.488            6.711
   65          1.946         2593.446            0.0              7.053            0.441            7.494
   83          1.526         2766.913            0.0              9.930            0.289           10.219
    3        127.966         5953.820          151.204            1.531            3.061            4.592
   79          1.748         2727.555            0.035            9.911            0.396            9.307
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    CAL ID NUMBER:  289   ENGINE TYPE AND MODEL: JT4A -11            SERIAL NUMBER:  P6106708

TEST ORGANIZATION:  S W R I TWA


  MODE     FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     CO        FUEL     LB CO /     ENERGY   LB CO /
             POWER        # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050        875.0   65.255   1442.430     1.000       19.00    20.664     456.77     45.240     277.08    0.07458
TAKEOFF     1.000      17500.0   20.322  15632.250     1.000        0.70     0.237     182.38      1.300     204.17    0.00116
CLIMBOUT    0.850      14875.0   21.792  13012.324     1.000        2.20     0.799     477.12      1.675     545.42    0.00146
APPROACH    0.400       7000.0   31.566   6255.691     1.000        4.00     2.104     417.05      5.046     466.67    0.00451
TAXI-IDLE   0.050        875.0   65.255   1442.430     1.000        7.00     7.613     168.28     45.240     102.08    0.07458

                                 TOTAL FOR CYCLE:                           31.418    1701.59                1595.42
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            18.464
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           19.693
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          1.355


  MODE     FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     HC        FUEL     LB HC /     ENERGY   LB HC /
             POWER        # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050        875.0   74.538   1442.430     1.000       19.00    23.604     456.77     51.675     277.08    0.08519
TAKEOFF     1.000      17500.0    0.0    15632.250     1.000        0.70     0.0       182.38      0.0       204.17    0.0
CLIMBOUT    0.850      14875.0    0.0    13012.324     1.000        2.20     0.0       477.12      0.0       545.42    0.0
APPROACH    0.400       7000.0    6.106   6255.691     1.000        4.00     0.407     417.05      0.976     466.67    0.00087
TAXI-IDLE   0.050        875.0   74.538   1442.430     1.000        7.00     8.696     168.28     51.675     102.08    0.08519

                                 TOTAL FOR CYCLE:                           32.707    1701.59                1595.42
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            19.221
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           20.500
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          0.0


  MODE     FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     NOX       FUEL     LB NOX/     ENERGY   LB NOX/
             POWER        # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.050        875.0    3.186   1442.430     1.000       19.00     1.009     456.77      2.209     277.08    0.00364
TAKEOFF     1.000      17500.0  215.725  15632.250     1.000        0.70     2.517     182.38     13.800     204.17    0.01233
CLIMBOUT    0.850      14875.0  156.059  13012.324     1.000        2.20     5.722     477.12     11.993     545.42    0.01049
APPROACH    0.400       7000.0   37.466   6255.691     1.000        4.00     2.498     417.05      5.989     466.67    0.00535
TAXI-IDLE   0.050        875.0    3.186   1442.430     1.000        7.00     0.372     168.28      2.209     102.08    0.00364

                                 TOTAL FOR CYCLE:                           12.117    1701.59                1595.42
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             7.121
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            7.595
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        143.817
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DATE:   8/ 3/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ****************************************************************************************************

    CAL ID NUMBER:  306    ENGINE TYPE AND MODEL:  JT4A -11                SERIAL NUMBER:   (TWA2220A)

                           RATED THRUST:        17500.

    ENGINE TOTAL TIME:                          27324. HRS

    TIME SINCE HOT SECTION OVERHAUL:              329. HRS
                                                     2
    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                 7619. HRS
         N2 COMPRESSOR OVERHAUL:                 7619. HRS
         COMBUSTOR CAN REPLACEMENT:               329. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:  329. HRS
         N1 TURBINE OVERHAUL:                    7619. HRS
         N2 TURBINE OVERHAUL:                    7619. HRS

    FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA ******************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   75.00   FINISH   75.00

    ATMOSPHERIC PRESSURE:              START   28.95   FINISH   28.95

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0116

    RELATIVE HUMIDITY:                    61.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

    SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

 NO2 DETERMINED BY SUBTRACTION.  THIS TEST IS THE FIRST OF 3 SUCCESSIVE TESTS
 ON THIS ENGINE.  THE FUEL USED FOR THIS TEST CONTAINED NO CI-2.


ELAPSED   TEST          POWER              ENGINE            MEASURED   GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
 TIME     MODE   THRUST,LBS  PERCENT        SPEED               FUEL    AIR FLOW      F/A      DISCHARGE   PRESSURE      INLET
                    OR        RATED          RPM                FLOW     LB/SEC                  TEMP        RATIO        TEMP
                    SHP       T.O.      N1         N2           LB/HR                          DEGREES F      EPR       DEGREES F

   0.0    1/ 0    9580.00      54    5550.00    8300.00      8100.00    199.10    0.011300      -0.00        1.98        -0.00
   8.30   2/ 1   11040.00      63    5800.00    8520.00      9360.00    212.50    0.012200      -0.00        2.18        -0.00
  18.45   3/ 2   14380.00      82    6390.00    8980.00     12840.00    235.00    0.015200      -0.00        2.61        -0.00
  23.30   4/ 3     600.00       3    2090.00    5250.00      1360.00     56.70    0.006700      -0.00       -0.00        -0.00
  29.00   5/ 4   13760.00      78    6250.00    8900.00     12300.00    231.50    0.014800      -0.00       -0.00        -0.00


 POWER     EXHAUST     EXHAUST         CO         CO         THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT      GAS         GAS          (WET)        2        (WET)     (WET)       2         X
 RATED       TEMP      PRESSURE       PPMV       (WET)      PPMV      PPMV     (WET)     (WET)
 T.O.     DEGREES F      PSIA                  PERCENT V                        PPMV      PPMV

  54       909.00       13.20        25.00       2.30       1.00     50.00      4.00     54.00     -0.00      -0.00      -0.00
  63       981.00       15.90        22.00       2.49       0.0      62.00      3.00     65.00     -0.00      -0.00      -0.00
  82      1198.00       21.20        22.00       3.08       0.0     100.00      2.00    102.00     -0.00      -0.00      -0.00
   3       574.00        0.70       464.00       1.35     870.00      3.00      6.00      9.00     -0.00      -0.00      -0.00
  78      1157.00       20.40        22.00       2.97       2.00     93.00      2.00     95.00     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2        NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR      LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  54        2.17      0.05      0.57   3129.70      7.11      7.68     17.54      0.40      4.61   25350.60     57.61     62.72
  63        1.76      0.0       0.39   3130.47      8.15      8.54     16.48      0.0       3.69   29301.24     76.27     79.96
  82        1.42      0.0       0.21   3131.01     10.63     10.84     18.28      0.0       2.73   40202.10    136.45    139.18
   3       62.38     66.98      1.32   2851.47      0.66      1.99     84.83     91.10      1.80    3878.00      0.90      2.70
  78        1.48      0.08      0.22   3130.71     10.25     10.47     18.15      0.95      2.71   38507.75    126.05    128.76


 POWER          CO                 CO              THC               NO              NO              NO
PERCENT                             2                                                  2               X
 RATED     LB/1K#TH-HR        LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR     LB/1K#TH-HR
 T.O.

  54          1.831            2646.201           0.042            6.014            0.481           6.495
  63          1.492            2654.098           0.0              6.909            0.334           7.243
  82          1.271            2795.696           0.0              9.489            0.190           9.679
   3        141.385            6463.340         151.827            1.502            3.003           4.505
  78          1.319            2798.529           0.069            9.161            0.197           9.358
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    CAL ID NUMBER:  306   ENGINE TYPE AND MODEL: JT4A -11               SERIAL NUMBER:  (TWA2220A)

TEST ORGANIZATION:  S W R I TWA


   MODE   FRACTIONAL     POWER   EMISSION    FUEL       USAGE    TIME IN      CO          FUEL     LB CO /    ENERGY   LB CO /
            POWER        # TH      RATE      RATE     WT FACTOR    MODE      MASS         MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                 MIN.      LBS.         LBS.

TAXI-IDLE  0.050         875.0    79.518   1388.586    1.000      19.00    25.181       439.72     57.266    277.08    0.09088
TAKEOFF    1.000       17500.0    16.858  15191.160    1.000       0.70     0.197       177.23      1.110    204.17    0.00096
CLIMBOUT   0.850       14875.0    18.710  13068.754    1.000       2.20     0.686       479.19      1.432    545.42    0.00126
APPROACH   0.400        7000.0    29.203   6079.773    1.000       4.00     1.947       405.32      4.803    466.67    0.00417
TAXI-IDLE  0.050         875.0    79.518   1388.586    1.000       7.00     9.277       162.00     57.266    102.08    0.09088

                                  TOTAL FOR CYCLE:                         37.288      1663.46               1595.42
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:          22.416
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:         23.372
                                  LBS POLLUTANT/1000K LB TH AT T.O.:        1.124


   MODE   FRACTIONAL     POWER   EMISSION    FUEL       USAGE    TIME IN      HC          FUEL     LB HC /    ENERGY   LB HC /
            POWER        # TH      RATE      RATE     WT FACTOR    MODE      MASS         MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                 MIN.      LBS.         LBS.

TAXI-IDLE  0.050         875.0    53.413   1388.586    1.000      19.00    16.914       439.72     38.466    277.08    0.06104
TAKEOFF    1.000       17500.0     1.723  15191.160    1.000       0.70     0.020       177.23      0.113    204.17    0.00010
CLIMBOUT   0.850       14875.0     3.492  13068.754    1.000       2.20     0.128       479.19      0.267    545.42    0.00023
APPROACH   0.400        7000.0     6.420   6079.773    1.000       4.00     0.428       405.32      1.056    466.67    0.00092
TAXI-IDLE  0.050         875.0    53.413   1388.586    1.000       7.00     6.232       162.00     38.466    102.08    0.06104

                                  TOTAL FOR CYCLE:                         23.722      1663.46               1595.42
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:          14.261
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:         14.869
                                  LBS POLLUTANT/1000K LB TH AT T.O.:        1.148


   MODE   FRACTIONAL     POWER   EMISSION    FUEL       USAGE    TIME IN     NOX          FUEL     LB NOX/    ENERGY   LB NOX/
            POWER        # TH      RATE      RATE     WT FACTOR    MODE      MASS         MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                 MIN.      LBS.         LBS.

TAXI-IDLE  0.050         875.0     2.744   1388.586    1.000      19.00     0.869       439.72      1.976    277.08    0.00314
TAKEOFF    1.000       17500.0   244.106  15191.160    1.000       0.70     2.848       177.23     16.069    204.17    0.01395
CLIMBOUT   0.850       14875.0   156.802  13068.754    1.000       2.20     5.749       479.19     11.998    545.42    0.01054
APPROACH   0.400        7000.0    34.578   6079.773    1.000       4.00     2.305       405.32      5.687    466.67    0.00494
TAXI-IDLE  0.050         875.0     2.744   1388.586    1.000       7.00     0.320       162.00      1.976    102.08    0.00314

                                  TOTAL FOR CYCLE:                         12.092      1663.46               1595.42
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:           7.269
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:          7.579
                                  LBS POLLUTANT/1000K LB TH AT T.O.:      162.737
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DATE:   8/ 3/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:  307    ENGINE TYPE AND MODEL:  JT4A -11                SERIAL NUMBER:  (TWA22208)

                              RATED THRUST:         17500.

     ENGINE TOTAL TIME:                             27324. HRS

     TIME SINCE HOT SECTION OVERHAUL:                 329. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                    7619. HRS
          N2 COMPRESSOR OVERHAUL:                    7619. HRS
          COMBUSTOR CAN REPLACEMENT:                  329. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     329. HRS
          N1 TURBINE OVERHAUL:                       7619. HRS
          N2 TURBINE OVERHAUL:                       7619. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA ********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   74.00   FINISH   73.00

     ATMOSPHERIC PRESSURE:              START   28.95   FINISH   28.95

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0117

     RELATIVE HUMIDITY:                        63.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

 NO2 DETERMINED BY SUBTRACTION THIS TEST IS THE SECOND OF THREE RUN ON THIS
 ENGINE.  THE FUEL USED FOR THIS TEST CONTAINED THE NORMAL CONCENTRATION OF CI-2
 (0.1% BY VOLUME).


 ELAPSED    TEST          POWER               ENGINE            MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE      TURBINE
  TIME      MODE    THRUST,LBS  PERCENT        SPEED              FUEL     AIR FLOW     F/A     DISCHARGE    PRESSURE      INLET
                        OR       RATED          RPM               FLOW     LB/SEC                 TEMP        RATIO        TEMP
                       SHP       T.O.      N1          N2         LB/HR                         DEGREES F      EPR       DEGREES F

   0.0      1/ 0    9480.00       54    5550.00   8290.00    8000.00    199.30    0.011200     -0.00       -0.00         -0.00
   4.35     2/ 1   11020.00       62    5790.00   8520.00    9330.00    212.40    0.012200     -0.00       -0.00         -0.00
  10.15     3/ 2   14460.00       82    6410.00   8990.00   12950.00    236.20    0.015200     -0.00       -0.00         -0.00
  15.00     4/ 3     600.00        3    2100.00   5220.00    1380.00     57.20    0.006700     -0.00       -0.00         -0.00
  24.00     5/ 4   14060.00       80    6340.00   8850.00   12640.00    234.20    0.015000     -0.00       -0.00         -0.00


 POWER    EXHAUST     EXHAUST        CO         CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS         GAS        (WET)         2       (WET)    (WET)        2         X
 RATED     TEMP      PRESSURE      PPMV       (WET)      PPMV     PPMV      (WET)     (WET)
 T.O.    DEGREES F     PSIA                 PERCENT V                       PPMV      PPMV

  54       889.00      13.10        39.00      2.25      1.00     46.00      2.00     48.00     -0.00     -0.00      -0.00
  62       977.00      15.90        33.00      2.41      0.0      58.00      4.00     62.00     -0.00     -0.00      -0.00
  82      1193.00      21.40        23.00      2.99      0.0      97.00      3.00    100.00     -0.00     -0.00      -0.00
   3       556.00       0.70       493.00      1.35    929.00      3.00      6.00      9.00     -0.00     -0.00      -0.00
  80      1179.00      21.00        28.00      2.96      2.00     94.00      2.00     96.00     -0.00     -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2        NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  54        3.45      0.05      0.29   3127.68      6.68      6.98     27.60      0.41      2.33   25021.45     53.48     55.80
  62        2.73      0.0       0.54   3128.96      7.87      8.42     25.44      0.0       5.07   29193.16     73.45     78.51
  82        1.53      0.0       0.33   3130.83     10.62     10.95     19.85      0.0       4.25   40544.28    137.50    141.76
   3       64.59     71.15      1.32   2836.56      0.66      1.98     89.13     98.19      1.82    3914.45      0.91      2.73
  80        1.88      0.08      0.22   3130.07     10.39     10.61     23.82      0.97      2.79   39564.07    131.35    134.14


 POWER         CO                CO              THC               NO                NO               NO
PERCENT                           2                                                   2                X
 RATED    LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR
 T.O.

  54          2.912          2639.393            0.043             5.641             0.245            5.886
  62          2.309          2649.107            0.0               6.665             0.460            7.125
  82          1.373          2803.892            0.0               9.509             0.294            9.803
   3        148.558          6524.082          163.647             1.516             3.031            4.547
  80          1.694          2813.945            0.069             9.342             0.199            9.541
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     CAL ID NUMBER:  307   ENGINE TYPE AND MODEL: JT4A -11            SERIAL NUMBER:  (TWA22208)

TEST ORGANIZATION:  S W R I TWA


   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      CO       FUEL      LB CO /      ENERGY    LB CO /
             POWER       # TH      RATE       RATE     WT FACTOR    MODE       MASS      MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                 MIN.       LBS.      LBS.

TAXI-IDLE    0.050       875.0    52.229   1168.591     1.000      19.00     16.539    370.05     44.694      277.08     0.05969
TAKEOFF      1.000     17500.0    19.325  15879.750     1.000       0.70      0.225    185.26      1.217      204.17     0.00110
CLIMBOUT     0.850     14875.0    21.154  13296.273     1.000       2.20      0.776    487.53      1.591      545.42     0.00142
APPROACH     0.400      7000.0    37.756   5973.191     1.000       4.00      2.517    398.21      6.321      466.67     0.00539
TAXI-IDLE    0.050       875.0    52.229   1168.591     1.000       7.00      6.093    136.34     44.694      102.08     0.05969

                                 TOTAL FOR CYCLE:                           26.150   1577.40                 1595.42
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            16.578
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           16.391
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          1.288


   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      HC       FUEL      LB HC /      ENERGY    LB HC /
             POWER       # TH      RATE       RATE     WT FACTOR    MODE       MASS      MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                 MIN.       LBS.      LBS.

TAXI-IDLE    0.050       875.0    66.201   1168.591     1.000      19.00     20.964    370.05     56.651      277.08     0.07566
TAKEOFF      1.000     17500.0     1.668  15879.750     1.000       0.70      0.019    185.26      0.105      204.17     0.00010
CLIMBOUT     0.850     14875.0     5.564  13296.273     1.000       2.20      0.204    487.53      0.418      545.42     0.00037
APPROACH     0.400      7000.0     3.617   5973.191     1.000       4.00      0.241    398.21      0.606      466.67     0.00052
TAXI-IDLE    0.050       875.0    66.201   1168.591     1.000       7.00      7.724    136.34     56.651      102.08     0.07566

                                 TOTAL FOR CYCLE:                           29.152   1577.40                 1595.42
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            18.481
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           18.272
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          1.112


   MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     NOX       FUEL      LB NOX/      ENERGY    LB NOX/
             POWER       # TH      RATE       RATE     WT FACTOR    MODE       MASS      MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                 MIN.       LBS.      LBS.

TAXI-IDLE    0.050       875.0     1.996   1168.591     1.000      19.00      0.632    370.05      1.708      277.08     0.00228
TAKEOFF      1.000     17500.0   250.650  15879.750     1.000       0.70      2.924    185.26     15.784      204.17     0.01432
CLIMBOUT     0.850     14875.0   158.907  13296.273     1.000       2.20      5.827    487.53     11.951      545.42     0.01068
APPROACH     0.400      7000.0    33.300   5973.191     1.000       4.00      2.220    398.21      5.575      466.67     0.00476
TAXI-IDLE    0.050       875.0     1.996   1168.591     1.000       7.00      0.233    136.34      1.708      102.08     0.00228

                                 TOTAL FOR CYCLE:                           11.836   1577.40                 1595.42
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             7.503
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            7.419
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        167.100
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DATE: 8/ 3/71

TEST ORGANIZATION: S W R I TWA

ENGINE SUPPLIER: T W A

ENGINE DATA **

CAL ID NUMBER: 308 ENGINE TYPE AND MODEL: JT4A -11 SERIAL NUMBER: (TWA2220C)

RATED THRUST: 17500.

ENGINE TOTAL TIME: 27324. HRS

TIME SINCE HOT SECTION OVERHAUL: 329. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	7619. HRS
N2 COMPRESSOR OVERHAUL:	7619. HRS
COMBUSTOR CAN REPLACEMENT:	329. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	329. HRS
N1 TURBINE OVERHAUL:	7619. HRS
N2 TURBINE OVERHAUL:	7619. HRS

FUEL: JP-4 TF FUEL H/C RATIO: 2.020

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 74.00 FINISH 72.00

ATMOSPHERIC PRESSURE: START 28.95 FINISH 28.95

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0118

RELATIVE HUMIDITY: 63.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 5

COMMENTS:

NO2 DETERMINED BY SUBTRACTION. THIS TEST IS THE THIRD OF THREE RUNS ON THIS ENGINE. THE FUEL USED FOR THIS TEST CONTAINED THE MINIMUM CONCENTRATION OF CI-2 (0.0125% BY VOLUME).

ELAPSED TIME	TEST MODE	POWER THRUST, LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	1/ 0	9500.00	54	5550.00	8350.00	8000.00	200.30	0.011100	-0.00	-0.00	-0.00
4.00	2/ 1	10960.00	62	5770.00	8520.00	3010.00	211.90	0.012200	-0.00	-0.00	-0.00
9.30	3/ 2	14440.00	82	6400.00	8970.00	12890.00	236.00	0.015200	-0.00	-0.00	-0.00
14.30	4/ 3	600.00	3	2100.00	5230.00	1360.00	57.20	0.006600	-0.00	-0.00	-0.00
18.30	5/ 4	14340.00	81	6370.00	8950.00	12860.00	235.20	0.015200	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
54	994.00	13.40	30.00	2.30	1.00	46.00	4.00	50.00	-0.00	-0.00	-0.00
62	973.00	15.80	26.00	2.53	0.0	57.00	5.00	62.00	-0.00	-0.00	-0.00
82	1188.00	21.30	25.00	3.05	0.0	95.00	3.00	98.00	-0.00	-0.00	-0.00
3	558.00	0.70	463.00	1.45	774.00	3.00	6.00	9.00	-0.00	-0.00	-0.00
81	1182.00	21.30	27.00	3.05	1.00	94.00	3.00	97.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
54	2.60	0.05	0.57	3129.03	6.54	7.11	20.78	0.40	4.55	25032.20	52.34	56.89
62	2.05	0.0	0.65	3130.02	7.37	8.02	6.16	0.0	1.95	9421.37	22.19	24.14
82	1.63	0.0	0.32	3130.68	10.19	10.52	21.05	0.0	4.15	40354.40	131.40	135.55
3	58.67	56.17	1.25	2886.96	0.62	1.87	79.79	76.39	1.70	3926.26	0.85	2.55
81	1.76	0.04	0.32	3130.37	10.09	10.41	22.68	0.48	4.14	40256.53	129.70	133.84

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_x LB/1K#TH-HR
54	2.187	2634.969	0.042	5.509	0.479	5.988
62	0.562	859.614	0.0	2.025	0.178	2.202
82	1.458	2794.626	0.0	9.100	0.287	9.387
3	132.385	6543.762	127.323	1.415	2.831	4.246
81	1.582	2807.290	0.034	9.045	0.289	9.333

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    CAL ID NUMBER:  308   ENGINE TYPE AND MODEL: JT4A -11             SERIAL NUMBER:  (TWA2220C)

TEST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     CO        FUEL     LB CO /    ENERGY   LB CO /
             POWER      # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.     LBS.       LBS.

TAXI-IDLE   0.050       875.0   59.243   1303.562     1.000      19.00    18.760     412.79     45.447    277.08    0.06771
TAKEOFF     1.000     17500.0   24.555  15797.063     1.000       0.70     0.286     184.30      1.554    204.17    0.00140
CLIMBOUT    0.850     14875.0   19.033  13215.137     1.000       2.20     0.698     484.55      1.440    545.42    0.00128
APPROACH    0.400      7000.0   31.630   6032.602     1.000       4.00     2.109     402.17      5.243    466.67    0.00452
TAXI-IDLE   0.050       875.0   59.243   1303.562     1.000       7.00     6.912     152.08     45.447    102.08    0.06771

                                TOTAL FOR CYCLE:                          28.765    1635.90               1595.42
                                LBS POLLUTANT/1K LB FUEL/CYCLE:           17.583
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:          18.030
                                LBS POLLUTANT/1000K LB TH AT T.O.:         1.637


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     HC        FUEL     LB HC /    ENERGY   LB HC /
             POWER      # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.     LBS.       LBS.

TAXI-IDLE   0.050       875.0   49.850   1303.562     1.000      19.00    15.786     412.79     38.241    277.08    0.05697
TAKEOFF     1.000     17500.0    1.999  15797.063     1.000       0.70     0.023     184.30      0.127    204.17    0.00011
CLIMBOUT    0.850     14875.0    1.133  13215.137     1.000       2.20     0.042     484.55      0.086    545.42    0.00008
APPROACH    0.400      7000.0    4.666   6032.602     1.000       4.00     0.311     402.17      0.774    466.67    0.00067
TAXI-IDLE   0.050       875.0   49.850   1303.562     1.000       7.00     5.816     152.08     38.241    102.08    0.05697

                                TOTAL FOR CYCLE:                          21.977    1635.90               1595.42
                                LBS POLLUTANT/1K LB FUEL/CYCLE:           13.434
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:          13.775
                                LBS POLLUTANT/1000K LB TH AT T.O.:         1.332


  MODF    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN    NOX        FUEL     LB NOX/    ENERGY   LB NOX/
             POWER      # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.     LBS.       LBS.

TAXI-IDLE   0.050       875.0    2.296   1303.562     1.000      19.00     0.727     412.79      1.761    277.08    0.00262
TAKEOFF     1.000     17500.0  230.544  15797.063     1.000       0.70     2.690     184.30     14.594    204.17    0.01317
CLIMBOUT    0.850     14875.0  152.740  13215.137     1.000       2.20     5.600     484.55     11.558    545.42    0.01027
APPROACH    0.400      7000.0   32.502   6032.602     1.000       4.00     2.167     402.17      5.388    466.67    0.00464
TAXI-IDLE   0.050       875.0    2.296   1303.562     1.000       7.00     0.268     152.08      1.761    102.08    0.00262

                                TOTAL FOR CYCLE:                          11.452    1635.90               1595.42
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            7.000
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           7.178
                                LBS POLLUTANT/1000K LB TH AT T.O.:       153.696
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DATE:   7/22/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  320    ENGINE TYPE AND MODEL:  JT4A -11                    SERIAL NUMBER:   P6111358

                              RATED THRUST:        17500.

     ENGINE TOTAL TIME:                            27483. HRS

     TIME SINCE HOT SECTION OVERHAUL:                284. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                   8050. HRS
          N2 COMPRESSOR OVERHAUL:                   8050. HRS
          COMBUSTOR CAN REPLACEMENT:                 284. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    284. HRS
          N1 TURBINE OVERHAUL:                      8050. HRS
          N2 TURBINE OVERHAUL:                      8050. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA ********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   76.00   FINISH   78.00

     ATMOSPHERIC PRESSURE:              START   28.91   FINISH   28.91

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0146

     RELATIVE HUMIDITY:                        73.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

 F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
 DETERMINED BY SUBTRACTION.


 ELAPSED    TEST          POWER                 ENGINE             MEASURED    GAS GEN       CALC     COMPRESSOR      ENGINE        TURBINE
  TIME      MODE    THRUST,LBS  PERCENT          SPEED                FUEL     AIR FLOW       F/A     DISCHARGE      PRESSURE        INLET
                        OR       RATED            RPM                 FLOW      LB/SEC                   TEMP          RATIO          TEMP
                       SHP       T.O.       N1           N2          LB/HR                           DEGREES F        EPR        DEGREES F

    0.0     1/ 0    10040.00        57    5660.00    8400.00      8040.00     203.00    0.011000       -0.00          2.04          -0.00
    6.30    2/ 1    11760.00        67    5950.00    8650.00      9480.00     218.00    0.012100       -0.00          2.25          -0.00
   10.50    3/ 2    14180.00        81    6430.00    9030.00     12000.00     235.00    0.014200       -0.00          2.56          -0.00
   16.00    4/ 3      520.00         2    2020.00    5100.00      1260.00      52.00    0.006800       -0.00         -0.00          -0.00
   18.00    5/ 4    14200.00        81    6420.00    9010.00     12040.00     234.00    0.014300       -0.00         -0.00          -0.00


 POWER     EXHAUST        EXHAUST          CO          CO          THC       NO          NO          NO      ALDEHYDES   SMOKE   PARTICULATES
PERCENT      GAS            GAS           (WET)          2        (WET)     (WET)          2           X
 RATED      TEMP         PRESSURE         PPMV        (WET)       PPMV      PPMV        (WET)       (WET)
 T.O.     DEGREES F        PSIA                     PERCENT V                           PPMV        PPMV

  57       934.00         14.00          27.00        2.18        4.00     49.00        2.00       51.00      -0.00      -0.00       -0.00
  67      1037.00         16.70          22.00        2.49        1.00     61.00        3.00       64.00      -0.00      -0.00       -0.00
  81      1202.00         20.50          17.00        2.83        0.0      88.00        2.00       90.00      -0.00      -0.00       -0.00
   2       547.00          0.50         473.00        1.26      736.00      3.00        4.00        7.00      -0.00      -0.00       -0.00
  81      1204.00         20.50          21.00        2.83        2.00     86.00        4.00       90.00      -0.00      -0.00       -0.00


 POWER     MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT       CO        HC        NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO        NOX
 RATED      LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  57          2.47      0.21      0.30   3128.79      7.35      7.65     15.83      1.68      2.41  25155.50     59.11     61.52
  67          1.76      0.05      0.39   3130.35      8.02      8.41     16.69      0.43      3.74  29675.72     76.00     79.74
  81          1.20      0.0       0.23   3131.36     10.18     10.41     14.37      0.0       2.78  37576.32    122.15    124.93
   2         68.31     60.87      0.95   2858.92      0.71      1.66     86.06     76.70      1.20   3602.24      0.90      2.09
  81          1.48      0.08      0.46   3130.70      9.95     10.41     17.80      0.97      5.57  37693.59    119.75    125.32


 POWER         CO                CO               THC              NO               NO              NO
PERCENT                            2                                                  2               X
 RATED    LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR     LB/1K#TH-HR
 T.O.

  57          1.975          2505.528            0.168            5.887            0.240           6.128
  67          1.419          2523.446            0.037            6.463            0.318           6.780
  81          1.013          2649.952            0.0              8.614            0.196           8.810
   2        165.509          6927.383          147.497            1.724            2.299           4.023
  81          1.254          2654.478            0.068            8.433            0.392           8.825
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     CAL ID NUMBER:  320   ENGINE TYPE AND MODEL: JT4A -11              SERIAL NUMBER:  P611135B

TEST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY    LB CO /
            POWER        # TH       RATE       RATE      WT FACTOR    MODE       MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                   MIN.       LBS.       LBS.

TAXI-IDLE   0.050        875.0    75.342    1454.479     1.000       19.00     23.858     460.58     51.800     277.08    0.08611
TAKEOFF     1.0C0      17500.0    20.761   14829.398     1.000        0.70      0.242     173.01      1.400     204.17    0.00119
CLIMBOUT    0.850      14875.0    17.684   12631.184     1.000        2.20      0.648     463.14      1.400     545.42    0.00119
APPROACH    0.400       7000.0    32.806    5334.313     1.000        4.00      2.187     355.62      6.150     466.67    0.00469
TAXI-IDLE   0.050        875.0    75.342    1454.479     1.000        7.00      8.790     169.69     51.800     102.08    0.08611
                                 TOTAL FOR CYCLE:                              35.726    1622.05               1595.42
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               22.025
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              22.393
                                 LBS POLLUTANT/1000K LB TH AT T.O.:             1.384

  MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY    LB HC /
            POWER        # TH       RATE       RATE      WT FACTOR    MODE       MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                   MIN.       LBS.       LBS.

TAXI-IDLE   0.050        875.0    62.941    1454.479     1.000       19.00     19.931     460.58     43.274     277.08    0.07193
TAKEOFF     1.000      17500.0     0.0     14829.398     1.000        0.70      0.0       173.01      0.0       204.17    0.0
CLIMBOUT    0.850      14875.0     0.0     12631.184     1.000        2.20      0.0       463.14      0.0       545.42    0.0
APPROACH    0.400       7000.0     6.271    5334.313     1.000        4.00      0.418     355.62      1.176     466.67    0.00090
TAXI-IDLE   0.050        875.0    62.941    1454.479     1.000        7.00      7.343     169.69     43.274     102.08    0.07193
                                 TOTAL FOR CYCLE:                              27.692    1622.05               1595.42
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               17.072
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              17.357
                                 LBS POLLUTANT/1000K LB TH AT T.O.:             0.0

  MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY    LB NOX/
            POWER        # TH       RATE       RATE      WT FACTOR    MODE       MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                   MIN.       LBS.       LBS.

TAXI-IDLE   0.050        875.0     1.777    1454.479     1.000       19.00      0.563     460.58      1.221     277.08    0.00203
TAKEOFF     1.000      17500.0   209.984   14829.398     1.000        0.70      2.450     173.01     14.160     204.17    0.01200
CLIMBOUT    0.850      14875.0   143.585   12631.184     1.000        2.20      5.265     463.14     11.367     545.42    0.00965
APPROACH    0.400       7000.0    31.720    5334.313     1.000        4.00      2.115     355.62      5.946     466.67    0.00453
TAXI-IDLE   0.050        875.0     1.777    1454.479     1.000        7.00      0.207     169.69      1.221     102.08    0.00203
                                 TOTAL FOR CYCLE:                              10.599    1622.05               1595.42
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:                6.534
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:               6.643
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           139.989
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DATE:   8/11/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIFR:    T W A

ENGINE DATA *******************************************************************************************************

     CAL ID NUMBER:  339    ENGINE TYPE AND MODEL:  JT4A -11               SERIAL NUMBER:   (TWA2260)

                         RATED THRUST:         17500.

     ENGINE TOTAL TIMF:                                  8055. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    3145. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        8055. HRS
          N2 COMPRESSOR OVERHAUL:                        8055. HRS
          COMBUSTOR CAN REPLACEMENT:                     3145. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        8055. HRS
          N1 TURBINE OVERHAUL:                           8055. HRS
          N2 TURBINE OVERHAUL:                           8055. HRS

     FUEL: JP-4 TF               FUEL H/C RATIO:   2.020

OPERATIONAL DATA ****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   76.00   FINISH   81.00

     ATMOSPHERIC PRESSURE:              START   28.98   FINISH   28.98

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0130

     RELATIVE HUMIDITY:                     56.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:  10

COMMENTS:

 NO2 DETERMINED BY SUBTRACTION.


 ELAPSED    TEST           POWER                 ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE       TURBINE
  TIME      MODE     THRUST,LBS  PERCENT          SPEED              FUEL     AIR FLOW      F/A      DISCHARGE    PRESSURE       INLET
                         OR       RATED            RPM               FLOW      LB/SEC                   TEMP         RATIO         TEMP
                        SHP       T.O.       N1          N2          LB/HR                           DEGREES F       EPR       DEGREES F

    0.0     1/ 0     9360.00        53     5660.00    8280.00     7850.00     204.00    0.010700       -0.00         1.97          -0.00
   14.00    2/ 1    10840.00        61     5890.00    8520.00     9110.00     215.00    0.011800       -0.00         2.14          -0.00
   28.00    3/ 2    14220.00        81     6500.00    8970.00    12510.00     237.00    0.014700       -0.00         2.58          -0.00
   35.00    4/ 3      620.00         3     2150.00    5240.00     1300.00      58.00    0.006200       -0.00        -0.00          -0.00
   43.00    7/ 4     1500.00         8     3160.00    6500.00     2000.00      85.10    0.006500       -0.00        -0.00          -0.00
   47.00    8/ 7     1750.00         9     3370.00    6700.00     2170.00      92.70    0.006500       -0.00        -0.00          -0.00
   52.30    9/ 8     2000.00        11     3540.00    6950.00     2340.00      98.90    0.006600       -0.00        -0.00          -0.00
   57.00   10/ 9     2500.00        14     3820.00    7100.00     2660.00     111.80    0.007400       -0.00        -0.00          -0.00
   59.00   11/10     3500.00        19     4330.00    7430.00     3400.00     134.00    0.007000       -0.00        -0.00          -0.00
   65.00   12/11     5000.00        28     4810.00    7730.00     4410.00     157.00    0.007800       -0.00        -0.00          -0.00


  POWER    EXHAUST      EXHAUST          CO          CO         THC       NO         NO         NO      ALDEHYDES    SMOKE   PARTICULATES
 PERCENT     GAS          GAS          (WET)          2        (WET)     (WET)        2          X
  RATED     TEMP        PRESSURE        PPMV       (WET)        PPMV      PPMV      (WET)      (WET)
  T.O.    DEGREES F       PSIA                   PERCENT V                          PPMV       PPMV

    53      898.00       13.10         28.00       2.14        4.00     45.00       2.00      47.00      -0.00      -0.00      -0.00
    61      972.00       15.40         24.00       2.37        3.00     56.00       4.00      60.00      -0.00      -0.00      -0.00
    81     1184.00       20.60         20.00       3.00        2.00     95.00       2.00      97.00      -0.00      -0.00      -0.00
     3      540.00        0.70        435.00       1.28      912.00      3.00       7.00      10.00      -0.00      -0.00      -0.00
     8      538.00        1.80        210.00       1.33      244.00      6.00       6.00      12.00      -0.00      -0.00      -0.00
     9      550.00        2.10        178.00       1.33      140.00     10.00       3.00      13.00      -0.00      -0.00      -0.00
    11      561.00        2.30        145.00       1.36       98.00     12.00       2.00      14.00      -0.00      -0.00      -0.00
    14      583.00        3.00        110.00       1.45       68.00     15.00       2.00      17.00      -0.00      -0.00      -0.00
    19      628.00        4.20         61.00       1.40       22.00     18.00       3.00      21.00      -0.00      -0.00      -0.00
    28      689.00        6.20         37.00       1.57       11.00     27.00       1.00      28.00      -0.00      -0.00      -0.00


  POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
  RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    53        2.61       0.21       0.31    3128.56       6.88       7.18      20.45       1.67       2.40   24559.21      53.99      56.39
    61        2.02       0.14       0.55    3129.68       7.73       8.28      18.38       1.32       5.03   28511.35      70.43      75.46
    81        1.33       0.08       0.22    3130.94      10.36      10.58      16.62       0.95       2.73   39168.12     129.66     132.39
     3       61.32      73.63       1.62    2834.91       0.69       2.32      79.71      95.71       2.11    3685.38       0.90       3.01
     8       30.45      20.26       1.43    3029.82       1.43       2.86      60.89      40.52       2.86    6059.63       2.86       5.72
     9       26.07      11.74       0.72    3060.08       2.41       3.13      56.56      25.48       1.57    6640.36       5.22       6.79
    11       20.99       8.09       0.47    3078.24       2.84       3.31      48.88      18.92       1.11    7203.08       6.64       7.75
    14       14.94       5.29       0.45    3095.25       3.35       3.79      39.75      14.07       1.19    8233.35       8.90      10.09
    19        8.64       1.78       0.70    3114.78       4.19       4.88      29.37       6.07       2.37   10590.24      14.23      16.61
    28        4.69       0.80       0.21    3123.69       5.62       5.82      20.66       3.52       0.92   13775.48      24.77      25.68


  POWER          CO                 CO                 THC                 NO                  NO                  NO
 PERCENT                             2                                                          2                   X
  RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR
  T.O.

    53           2.185           2623.848             0.179               5.768               0.256               6.024
    61           1.695           2630.198             0.121               6.497               0.464               6.961
    81           1.169           2754.439             0.067               9.118               0.192               9.310
     3         128.568           5944.168           154.377               1.456               3.398               4.855
     8          40.596           4039.758            27.015               1.905               1.905               3.810
     9          32.321           3734.495            14.559               2.983               0.895               3.877
    11          24.439           3601.543             9.460               3.322               0.554               3.876
    14          15.901           3293.342             5.630               3.562               0.475               4.036
    19           8.391           3025.784             1.733               4.067               0.678               4.745
    28           4.132           2755.096             0.704               4.953               0.183               5.137
    CAL ID NUMBER:  339   ENGINE TYPE AND MODEL: JT4A -11              SERIAL NUMBER:  (TWA2260)

TEST ORGANIZATION:  S W R I TWA

   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY   LB CO /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.050       875.0    82.774    1473.194     1.000       19.00    26.212     466.51     56.187     277.08     0.09460
TAKEOFF     1.000     17500.0    19.662   15124.785     1.000        0.70     0.229     176.46      1.300     204.17     0.00112
CLIMBOUT    0.850     14875.0    16.669   12822.031     1.000        2.20     0.611     470.14      1.300     545.42     0.00112
APPROACH    0.400      7000.0    20.265    6235.242     1.000        4.00     1.351     415.68      3.250     466.67     0.00289
TAXI-IDLE   0.050       875.0    82.774    1473.194     1.000        7.00     9.657     171.87     56.187     102.08     0.09460

                                 TOTAL FOR CYCLE:                            38.060    1700.66                1595.42
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             22.380
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            23.856
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           1.311

   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY   LB HC /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.050       875.0    83.825    1473.194     1.000       19.00    26.544     466.51     56.900     277.08     0.09580
TAKEOFF     1.000     17500.0     0.0     15124.785     1.000        0.70     0.0       176.46      0.0       204.17     0.0
CLIMBOUT    0.850     14875.0     0.0     12822.031     1.000        2.20     0.0       470.14      0.0       545.42     0.0
APPROACH    0.400      7000.0     1.122    6235.242     1.000        4.00     0.075     415.68      0.180     466.67     0.00016
TAXI-IDLE   0.050       875.0    83.825    1473.194     1.000        7.00     9.780     171.87     56.900     102.08     0.09580

                                 TOTAL FOR CYCLE:                            36.399    1700.66                1595.42
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             21.403
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            22.815
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           0.0

   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY   LB NOX/
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.050       875.0     3.587    1473.194     1.000       19.00     1.136     466.51      2.435     277.08     0.00410
TAKEOFF     1.000     17500.0   198.740   15124.785     1.000        0.70     2.319     176.46     13.140     204.17     0.01136
CLIMBOUT    0.850     14875.0   144.152   12822.031     1.000        2.20     5.286     470.14     11.242     545.42     0.00969
APPROACH    0.400      7000.0    44.432    6235.242     1.000        4.00     2.962     415.68      7.126     466.67     0.00635
TAXI-IDLE   0.050       875.0     3.587    1473.194     1.000        7.00     0.418     171.87      2.435     102.08     0.00410

                                 TOTAL FOR CYCLE:                            12.121    1700.66                1595.42
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              7.127
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             7.597
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         132.493
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DATE:   8/ 2/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:  290    ENGINE TYPE AND MODEL:  JT8D-1                    SERIAL NUMBER:   P6491258

                          RATED THRUST:        14000.

     ENGINE TOTAL TIME:                            14289. HRS

     TIME SINCE HOT SECTION OVERHAUL:               3433. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                   8843. HRS
          N2 COMPRESSOR OVERHAUL:                   8843. HRS
          COMBUSTOR CAN REPLACEMENT:                8843. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:   8843. HRS
          N1 TURBINE OVERHAUL:                      8843. HRS
          N2 TURBINE OVERHAUL:                      8843. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA ***********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   83.00   FINISH   83.00

     ATMOSPHERIC PRESSURE:              START   28.96   FINISH   28.96

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0127

     RELATIVE HUMIDITY:                       49.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

 NO2 DETERMINED BY SUBTRACTION.


 ELAPSED     TEST            POWER                    ENGINE             MEASURED    GAS GEN       CALC     COMPRESSOR     ENGINE       TURBINE
  TIME       MODE      THRUST,LBS  PERCENT            SPEED                FUEL     AIR FLOW       F/A      DISCHARGE    PRESSURE       INLET
                           OR       RATED              RPM                 FLOW      LB/SEC                   TEMP         RATIO         TEMP
                          SHP       T.O.         N1           N2          LB/HR                            DEGREES F       EPR       DEGREES F

   0.0       1/ 0     9660.00        68     7310.00  11080.00     5640.00     114.60    0.013700        -0.00          1.65          -0.00
  17.00      2/ 1    11480.00        81     7720.00  11400.00     6780.00     127.80    0.014700        -0.00          1.79          -0.00
  30.00      3/ 2    12520.00        89     7990.00  11510.00     7590.00     133.50    0.015800        -0.00          1.90          -0.00
  35.00      4/ 3      800.00         5     2580.00   6770.00      880.00      32.20    0.007600        -0.00         -0.00          -0.00
  47.00      5/ 4    12420.00        88     7950.00  11490.00     7590.00     134.40    0.015700        -0.00         -0.00          -0.00


 POWER     EXHAUST      EXHAUST          CO         CO        THC       NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
PERCENT      GAS          GAS          (WET)         2       (WET)    (WET)         2           X
 RATED      TEMP        PRESSURE        PPMV       (WET)      PPMV     PPMV       (WET)       (WET)
 T.O.     DEGREES F       PSIA                   PERCENT V                         PPMV        PPMV

   68       919.00        9.10         16.00       2.80      1.00     61.00       5.00       66.00     -0.00       -0.00       -0.00
   81       986.00       11.20         13.00       2.96      0.0      84.00       5.00       89.00     -0.00       -0.00       -0.00
   89      1026.00       12.60         12.00       3.07      0.0     105.00       5.00      110.00     -0.00       -0.00       -0.00
    5       741.00        0.50        394.00       1.59    202.00      4.00       7.00       11.00     -0.00       -0.00       -0.00
   88      1038.00       12.50         13.00       3.12      1.00    104.00       5.00      109.00     -0.00       -0.00       -0.00


 POWER     MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT       CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED      LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   68        1.14      0.04      0.54   3131.34      7.13      7.72      6.42      0.23      3.30  17660.76     40.22     43.52
   81        0.88      0.0       0.55   3131.86      9.29      9.84      5.94      0.0       3.75  21234.04     62.99     66.74
   89        0.78      0.0       0.53   3132.02     11.20     11.73      5.91      0.0       4.05  23772.00     85.00     89.04
    5       47.63     13.99      1.39   3020.04      0.79      2.18     41.91     12.31      1.22   2657.63      0.70      1.92
   88        0.83      0.04      0.52   3131.84     10.91     11.44      6.30      0.28      3.98  23770.63     82.83     86.81


 POWER          CO                CO               THC                NO                 NO                NO
PERCENT                            2                                                      2                 X
 RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

   68          0.665          1828.236           0.024             4.164             0.341             4.505
   81          0.517          1849.456           0.0               5.487             0.327             5.814
   89          0.472          1898.722           0.0               6.789             0.323             7.112
    5         52.392          3322.042          15.394             0.874             1.529             2.403
   88          0.504          1913.899           0.022             6.669             0.321             6.990
   CAL ID NUMBER:  290   ENGINE TYPE AND MODEL: JT8D-1                SERIAL NUMBER:  P6491258

TEST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     CO        FUEL     LB CO /    ENERGY   LB CO /
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060      840.0    44.872    892.665    1.000      19.00    14.209     282.68     50.267    266.00    0.05342
TAKEOFF     1.000    14000.0     7.696   8832.207    1.000       0.70     0.090     103.04      0.871    163.33    0.00055
CLIMBOUT    0.850    11900.0     7.503   7263.258    1.000       2.20     0.275     266.32      1.033    436.33    0.00063
APPROACH    0.400     5600.0    18.495   3536.526    1.000       4.00     1.233     235.77      5.230    373.33    0.00330
TAXI-IDLE   0.060      840.0    44.872    892.665    1.000       7.00     5.235     104.14     50.267     98.00    0.05342

                              TOTAL FOR CYCLE:                          21.042     991.95               1337.00
                              LBS POLLUTANT/1K LB FUEL/CYCLE:           21.213
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:          15.739
                              LBS POLLUTANT/1000K LB TH AT T.O.:         0.641

  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     HC        FUEL     LB HC /    ENERGY   LB HC /
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060      840.0    13.341    892.665    1.000      19.00     4.225     282.68     14.946    266.00    0.01588
TAKEOFF     1.000    14000.0     0.768   8832.207    1.000       0.70     0.009     103.04      0.087    163.33    0.00005
CLIMBOUT    0.850    11900.0     0.632   7263.258    1.000       2.20     0.023     266.32      0.087    436.33    0.00005
APPROACH    0.400     5600.0     0.858   3536.526    1.000       4.00     0.057     235.77      0.242    373.33    0.00015
TAXI-IDLE   0.060      840.0    13.341    892.665    1.000       7.00     1.556     104.14     14.946     98.00    0.01588

                              TOTAL FOR CYCLE:                           5.871     991.95               1337.00
                              LBS POLLUTANT/1K LB FUEL/CYCLE:            5.918
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:           4.391
                              LBS POLLUTANT/1000K LB TH AT T.O.:         0.640

  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN    NOX        FUEL     LB NOX/    ENERGY   LB NOX/
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060      840.0     1.780    892.665    1.000      19.00     0.564     282.68      1.994    266.00    0.00212
TAKEOFF     1.000    14000.0   122.597   8832.207    1.000       0.70     1.430     103.04     13.881    163.33    0.00876
CLIMBOUT    0.850    11900.0    78.214   7263.258    1.000       2.20     2.868     266.32     10.768    436.33    0.00657
APPROACH    0.400     5600.0    13.520   3536.526    1.000       4.00     0.901     235.77      3.823    373.33    0.00241
TAXI-IDLE   0.060      840.0     1.780    892.665    1.000       7.00     0.208     104.14      1.994     98.00    0.00212

                              TOTAL FOR CYCLE:                           5.971     991.95               1337.00
                              LBS POLLUTANT/1K LB FUEL/CYCLE:            6.019
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:           4.466
                              LBS POLLUTANT/1000K LB TH AT T.O.:       102.164
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DATE:   7/15/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:  300    ENGINE TYPE AND MODEL:  JT8D-1                    SERIAL NUMBER:   649L37B

                            RATED THRUST:        14000.

     ENGINE TOTAL TIME:                                8574. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  2789. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      8574. HRS
          N2 COMPRESSOR OVERHAUL:                      8574. HRS
          COMBUSTOR CAN REPLACEMENT:                   2789. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      2789. HRS
          N1 TURBINE OVERHAUL:                         8574. HRS
          N2 TURBINE OVERHAUL:                         8574. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA ***********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   72.00   FINISH   72.00

     ATMOSPHERIC PRESSURE:              START   28.87   FINISH   28.87

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0143

     RELATIVE HUMIDITY:                       82.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:   5

 COMMENTS:

  F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
  DETERMINED BY SUBTRACTION.


 ELAPSED   TEST          POWER               ENGINE           MEASURED   GAS GEN     CALC    COMPRESSOR    ENGINE     TURBINE
  TIME     MODE    THRUST,LBS  PERCENT        SPEED              FUEL    AIR FLOW     F/A    DISCHARGE    PRESSURE     INLET
                       OR       RATED          RPM               FLOW     LB/SEC                TEMP        RATIO       TEMP
                      SHP       T.O.      N1          N2         LB/HR                        DEGREES F      EPR      DEGREES F

    0.0    1/ 0     9600.00       68    7270.00  11140.00     5530.00    115.30   0.013300     -0.00        1.65       -0.00
    4.00   2/ 1    11330.00       80    7680.00  11470.00     6620.00    127.70   0.014400     -0.00        1.80       -0.00
    7.30   3/ 2    13040.00       93    8080.00  11750.00     7760.00    140.10   0.015400     -0.00        1.94       -0.00
   12.30   4/ 3      680.00        4    2520.00   6620.00      950.00     26.40   0.010000     -0.00       -0.00       -0.00
   14.50   5/ 4    13040.00       93    8100.00  11780.00     7810.00    140.10   0.015500     -0.00        1.90       -0.00


  POWER    EXHAUST      EXHAUST        CO        CO        THC      NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT    GAS          GAS          (WET)       2       (WET)    (WET)       2         X
  RATED     TEMP       PRESSURE       PPMV     (WET)      PPMV     PPMV     (WET)     (WET)
  T.O.   DEGREES F      PSIA                  PERCENT V                      PPMV      PPMV

   68     852.00         9.10         32.00      2.63      4.00     50.00     6.00     56.00     -0.00     -0.00      -0.00
   80     915.00        11.20         15.00      2.72      4.00     63.00     4.00     67.00     -0.00     -0.00      -0.00
   93     990.00        13.30          6.00      2.98      5.00     81.00     3.00     84.00     -0.00     -0.00      -0.00
    4     687.00         0.40        474.00      1.95    152.00      3.00     8.00     11.00     -0.00     -0.00      -0.00
   93     990.00        13.30         22.00      3.19     10.00     80.00     7.00     87.00     -0.00     -0.00      -0.00


  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2        NO       NOX
  RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   68       2.42      0.17      0.75   3128.96      6.22      6.96     13.40      0.96      4.13  17303.13     34.39     38.52
   80       1.10      0.17      0.48   3131.06      7.58      8.06      7.27      1.11      3.19  20727.59     50.19     53.37
   93       0.40      0.19      0.33   3132.08      8.90      9.23      3.11      1.49      2.56  24304.96     69.06     71.62
    4      46.97      8.63      1.30   3035.79      0.49      1.79     44.62      8.19      1.24   2884.00      0.46      1.70
   93       1.37      0.36      0.72   3130.10      8.21      8.92     10.73      2.79      5.61  24446.09     64.09     69.70


  POWER        CO              CO               THC               NO               NO              NO
 PERCENT                        2                                                   2               X
  RATED   LB/1K#TH-HR     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR     LB/1K#TH-HR
  T.O.

   68         1.396         1802.410           0.100            3.582            0.430           4.012
   80         0.642         1829.443           0.098            4.430            0.281           4.711
   93         0.239         1863.877           0.114            5.296            0.196           5.492
    4        65.613         4241.168          12.050            0.682            1.819           2.501
   93         0.423         1874.700           0.214            4.915            0.430           5.345
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    CAL ID NUMBER:  300   ENGINE TYPE AND MODEL: JT8D-1                SERIAL NUMBER:  649L378

TEST ORGANIZATION:  S W R I TWA

   MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      CO        FUEL     LB CO /    ENERGY    LB CO /
             POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE    0.060       840.0    48.934   1049.424     1.000      19.00     15.496     332.32     46.629    266.00    0.05825
TAKEOFF      1.000     14000.0    10.863   8464.215     1.000       0.70      0.127      98.75      1.283    163.33    0.00078
CLIMBOUT     0.850     11900.0    12.603   6975.336     1.000       2.20      0.462     255.76      1.807    436.33    0.00106
APPROACH     0.400      5600.0    21.337   3388.150     1.000       4.00      1.422     225.88      6.297    373.33    0.00381
TAXI-IDLE    0.060       840.0    48.934   1049.424     1.000       7.00      5.709     122.43     46.629     98.00    0.05825

                                  TOTAL FOR CYCLE:                          23.216    1035.14               1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:           22.428
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:          17.364
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         0.905

   MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      HC        FUEL     LB HC /    ENERGY    LB HC /
             POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE    0.060       840.0     8.073   1049.424     1.000      19.00      2.557     332.32      7.693    266.00    0.00961
TAKEOFF      1.000     14000.0     1.490   8464.215     1.000       0.70      0.017      98.75      0.176    163.33    0.00011
CLIMBOUT     0.850     11900.0     1.228   6975.336     1.000       2.20      0.045     255.76      0.176    436.33    0.00010
APPROACH     0.400      5600.0     1.276   3388.150     1.000       4.00      0.085     225.88      0.377    373.33    0.00023
TAXI-IDLE    0.060       840.0     8.073   1049.424     1.000       7.00      0.942     122.43      7.693     98.00    0.00961

                                  TOTAL FOR CYCLE:                           3.646    1035.14               1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            3.522
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           2.727
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         1.241

   MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/    ENERGY    LB NOX/
             POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR     I B/HR                 MIN.       LBS.       LBS.

TAXI-IDLE    0.060       840.0     1.744   1049.424     1.000      19.00      0.552     332.32      1.662    266.00    0.00208
TAKEOFF      1.000     14000.0    85.298   8464.215     1.000       0.70      0.995      98.75     10.078    163.33    0.00609
CLIMBOUT     0.850     11900.0    58.072   6975.336     1.000       2.20      2.129     255.76      8.325    436.33    0.00488
APPROACH     0.400      5600.0    15.198   3388.150     1.000       4.00      1.013     225.88      4.485    373.33    0.00271
TAXI-IDLE    0.060       840.0     1.744   1049.424     1.000       7.00      0.204     122.43      1.662     98.00    0.00208

                                  TOTAL FOR CYCLE:                           4.894    1035.14               1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            4.727
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           3.660
                                  LBS POLLUTANT/1000K LB TH AT T.O.:        71.082
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DATE:  8/ 5/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ****************************************************************************************************

    CAL ID NUMBER:  316    ENGINE TYPE AND MODEL:  JT8D-1                    SERIAL NUMBER:    P649185B

                         RATED THRUST:          14000.

    ENGINE TOTAL TIME:                               15745. HRS

    TIME SINCE HOT SECTION OVERHAUL:                  2685. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                     11945. HRS
         N2 COMPRESSOR OVERHAUL:                     11945. HRS
         COMBUSTOR CAN REPLACEMENT:                   2685. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     11945. HRS
         N1 TURBINE OVERHAUL:                        11945. HRS
         N2 TURBINE OVERHAUL:                        11945. HRS

    FUEL: JP-4 TF               FUEL H/C RATIO:   2.020

OPERATIONAL DATA ****************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START    71.00   FINISH   70.00

    ATMOSPHERIC PRESSURE:              START    29.10   FINISH   29.11

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0127

    RELATIVE HUMIDITY:                    72.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    42.50

    SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   8

COMMENTS:

 NO2 DETERMINED BY SUBTRACTION.  THIS TEST IS THE FIRST OF THREE RUN ON THIS
 ENGINE.  THE FUEL USED CONTAINED NO CI-2.


                                                                                                              TURBINE
                                                                          COMPRESSOR      ENGINE          INLET
ELAPSED   TEST         POWER                ENGINE        MEASURED  GAS GEN    CALC     DISCHARGE      PRESSURE          TEMP
 TIME     MODE    THRUST,LBS  PERCENT       SPEED           FUEL    AIR FLOW    F/A        TEMP          RATIO       DEGREES F
                     OR        RATED         RPM            FLOW     LB/SEC              DEGREES F         EPR
                     SHP       T.O.      N1        N2       LB/HR

   0.0    1/ 0     9560.00      68    7300.00  11000.00   5610.00   115.60   0.013500     -0.00          1.65          -0.00
   7.00   2/ 1    11500.00      82    7750.00  11340.00   6810.00   130.00   0.014500     -0.00          1.80          -0.00
  13.20   3/ 2    13100.00      93    8140.00  11630.00   7940.00   141.10   0.015600     -0.00          1.95          -0.00
  18.10   4/ 3     1050.00       7    2970.00   7350.00   1060.00    37.10   0.007900     -0.00         -0.00          -0.00
  24.45   7/ 4     1520.00      10    3540.00   8030.00   1400.00    42.40   0.009200     -0.00         -0.00          -0.00
  27.45   8/ 7     2500.00      17    4390.00   8970.00   2010.00    54.90   0.010200     -0.00         -0.00          -0.00
  29.40   9/ 8     5020.00      35    5840.00   9990.00   3020.00    80.40   0.010400     -0.00         -0.00          -0.00
  32.30  10/ 9     7120.00      50    6600.00  10530.00   4090.00    97.80   0.011400     -0.00         -0.00          -0.00


                                                                  NO         NO      ALDEHYDES    SMOKE    PARTICULATES
 POWER    EXHAUST      EXHAUST        CO         CO      THC       NO          2          X
PERCENT     GAS          GAS        (WET)         2     (WET)     (WET)     (WET)      (WET)
 RATED     TEMP       PRESSURE      PPMV       (WET)    PPMV      PPMV      PPMV       PPMV
 T.O.   DEGREES F       PSIA                 PERCENT V

  68      865.00        9.40        29.00       2.75     0.0     53.00      5.00      58.00      -0.00       -0.00       -0.00
  82      925.00       11.50        20.00       2.95     0.0     69.00      5.00      74.00      -0.00       -0.00       -0.00
  93      988.00       13.50        16.00       3.16     0.0     87.00      6.00      93.00      -0.00       -0.00       -0.00
   7      649.00        0.70       388.00       1.64    84.00     7.00      8.00      15.00      -0.00       -0.00       -0.00
  10      694.00        1.10       300.00       1.89    57.00    12.00      7.00      19.00      -0.00       -0.00       -0.00
  17      742.00        1.93       142.00       2.09    22.00    14.00      8.00      22.00      -0.00       -0.00       -0.00
  35      634.00        4.30        56.00       2.13     6.00    27.00      1.00      28.00      -0.00       -0.00       -0.00
  50      768.00        6.20        39.30       2.33     1.00    34.00      4.00      38.00      -0.00       -0.00       -0.00


 POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  68       2.10      0.0       0.59    3129.94     6.31      6.90     11.78      0.0       3.34   17558.96    35.38     38.71
  82       1.35      0.0       0.55    3131.12     7.66      8.21      9.20      0.0       3.78   21322.91    52.14     55.92
  93       1.01      0.0       0.62    3131.66     9.01      9.63      8.01      0.0       4.94   24865.35    71.57     76.50
   7      45.86      5.69      1.55    3045.59     1.36      2.91     48.61      6.03      1.65    3228.32     1.44      3.09
  10      31.07      3.08      1.19    3075.95     2.04      3.23     43.50      4.32      1.67    4306.33     2.86      4.53
  17      15.32      1.19      1.24    3105.90     2.17      3.42     30.80      2.40      2.50    6242.86     4.37      6.87
  35       5.23      0.32      0.15    3124.15     4.14      4.29     15.79      0.97      0.46    9434.92    12.50     17.97
  50       3.33      0.05      0.56    3127.87     4.77      5.33     13.63      0.20      2.30   12792.99    19.52     21.81


                                                                                         NO
 POWER          CO               CO               THC              NO               NO                X
PERCENT                           2                                                  2
 RATED    LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
 T.O.

  68         1.233          1836.712           0.0              3.701            0.349            4.050
  82         0.900          1854.166           0.0              4.534            0.329            4.862
  93         0.612          1898.118           0.0              5.463            0.377            5.840
   7        46.295          3074.593           5.740            1.372            1.568            2.940
  10        28.621          2833.114           2.841            1.880            1.097            2.977
  17        12.319          2497.143           0.958            1.749            0.999            2.748
  35         3.145          1879.466           0.193            2.491            0.092            2.583
  50         1.914          1796.769           0.028            2.741            0.322            3.063
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    CAL ID NUMBER:  316   ENGINE TYPE AND MODEL: JT8D-1                    SERIAL NUMBER:  P6491858

TEST ORGANIZATION:  S W R I TWA


  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      CO         FUEL    LB CO /      ENERGY    LB CO /
            POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR     LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060      840.0    51.645    746.851     1.000       19.00     16.354      236.50    69.151      266.00     0.06148
TAKEOFF     1.000    14000.0     5.374   8484.348     1.000        0.70      0.063       98.98     0.633      163.33     0.00038
CLIMBOUT    0.850    11900.0     9.532   7148.559     1.000        2.20      0.350      262.11     1.333      436.33     0.00080
APPROACH    0.400     5600.0    17.154   3492.050     1.000        4.00      1.144      232.80     4.912      373.33     0.00306
TAXI-IDLE   0.060      840.0    51.645    746.851     1.000        7.00      6.025       87.13    69.151       98.00     0.06148

                               TOTAL FOR CYCLE:                             23.935      917.54                1337.00
                               LBS POLLUTANT/1K LB FUEL/CYCLE:              26.087
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:             17.902
                               LBS POLLUTANT/1000K LB TH AT T.O.:            0.448


  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      HC         FUEL    LB HC /      ENERGY    LB HC /
            POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR     LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060      840.0     5.938    746.851     1.000       19.00      1.880      236.50     7.950      266.00     0.00707
TAKEOFF     1.000    14000.0     0.0     8484.348     1.000        0.70      0.0         98.98     0.0        163.33     0.0
CLIMBOUT    0.850    11900.0     0.0     7148.559     1.000        2.20      0.0        262.11     0.0        436.33     0.0
APPROACH    0.400     5600.0     0.835   3492.050     1.000        4.00      0.056      232.80     0.239      373.33     0.00015
TAXI-IDLE   0.060      840.0     5.938    746.851     1.000        7.00      0.693       87.13     7.950       98.00     0.00707

                               TOTAL FOR CYCLE:                              2.629      917.54                1337.00
                               LBS POLLUTANT/1K LB FUEL/CYCLE:               2.865
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:              1.966
                               LBS POLLUTANT/1000K LB TH AT T.O.:            0.0


  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     NOX         FUEL    LB NOX/      ENERGY    LB NOX/
            POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR     LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060      840.0     1.910    746.851     1.000       19.00      0.605      236.50     2.558      266.00     0.00227
TAKEOFF     1.000    14000.0    94.082   8484.348     1.000        0.70      1.098       98.98    11.089      163.33     0.00672
CLIMBOUT    0.850    11900.0    61.555   7148.559     1.000        2.20      2.257      262.11     8.611      436.33     0.00517
APPROACH    0.400     5600.0    16.980   3492.050     1.000        4.00      1.132      232.80     4.863      373.33     0.00303
TAXI-IDLE   0.060      840.0     1.910    746.851     1.000        7.00      0.223       87.13     2.558       98.00     0.00227

                               TOTAL FOR CYCLE:                              5.314      917.54                1337.00
                               LBS POLLUTANT/1K LB FUEL/CYCLE:               5.792
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:              3.975
                               LBS POLLUTANT/1000K LB TH AT T.O.:           78.401
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DATE:   8/ 5/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ***************************************************************************************************************

     CAL ID NUMBER:  317    ENGINE TYPE AND MODEL:  JT8D-1                      SERIAL NUMBER:  P6491858

                            RATED THRUST:         14000.

     ENGINE TOTAL TIME:                           15745. HRS

     TIME SINCE HOT SECTION OVERHAUL:              2685. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                 11945. HRS
          N2 COMPRESSOR OVERHAUL:                 11945. HRS
          COMBUSTOR CAN REPLACEMENT:               2685. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 11945. HRS
          N1 TURBINE OVERHAUL:                    11945. HRS
          N2 TURBINE OVERHAUL:                    11945. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA *******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   69.00   FINISH   69.00

     ATMOSPHERIC PRESSURE:              START   29.11   FINISH   29.11

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0121

     RELATIVE HUMIDITY:                      69.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   4

COMMENTS:

 NO2 DETERMINED BY SUBTRACTION.  THIS TEST IS THE SECOND OF THREE RUN ON THIS
 ENGINE.  THE FUEL USED CONTAINED THE NORMAL CONCENTRATION OF CI-2 (0.1% BY
 VOLUME).


 ELAPSED    TEST          POWER                  ENGINE          MEASURED    GAS GEN     CALC     COMPRESSOR     ENGINE       TURBINE
  TIME      MODE    THRUST,LBS  PERCENT          SPEED             FUEL      AIR FLOW    F/A      DISCHARGE     PRESSURE       INLET
                        OR       RATED            RPM              FLOW      LB/SEC                 TEMP         RATIO         TEMP
                       SHP       T.O.       N1          N2         LB/HR                         DEGREES F        EPR        DEGREES F

    0.0     1/ 0     9540.00      68     7250.00  10940.00       5590.00     115.20   0.013500     -0.00         -0.00         -0.00
    6.30    2/ 1    11460.00      81     7740.00  11320.00       6780.00     129.70   0.014500     -0.00         -0.00         -0.00
    9.15    3/ 2    13060.00      93     8110.00  11580.00       7840.00     140.20   0.015500     -0.00         -0.00         -0.00
   12.00    4/ 3     1080.00       7     3020.00   7350.00       1070.00      36.60   0.008100     -0.00         -0.00         -0.00


  POWER    EXHAUST      EXHAUST         CO        CO       THC       NO        NO        NO    ALDEHYDES   SMOKE    PARTICULATES
 PERCENT     GAS          GAS          (WET)       2      (WET)     (WET)       2         X
  RATED      TEMP       PRESSURE       PPMV     (WET)     PPMV      PPMV     (WET)     (WET)
  T.O.    DEGREES F       PSIA                PERCENT V                       PPMV      PPMV

    68     862.00         9.30        43.00      2.71      0.0      50.00     3.00     53.00    -0.00      -0.00      -0.00
    81     919.00        11.50        37.00      2.91      0.0      67.00     3.00     70.00    -0.00      -0.00      -0.00
    93     577.00        13.40        23.00      3.10      0.0      83.00     5.00     88.00    -0.00      -0.00      -0.00
     7     649.00         0.70       397.00      1.68    110.00      9.00     5.00     14.00    -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    68       3.16      0.0       0.36    3128.28      6.03      6.40     17.66      0.0       2.02   17487.07     33.73     35.75
    81       2.53      0.0       0.34    3129.26      7.53      7.87     17.17      0.0       2.29   21216.40     51.07     53.35
    93       1.48      0.0       0.53    3130.92      8.76      9.29     11.59      0.0       4.14   24546.40     69.70     72.84
     7      45.74      7.26      0.95    3041.46      1.70      2.65     48.94      7.77      1.01    3254.36      1.82      2.84


  POWER         CO              CO              THC              NO              NO              NO
 PERCENT                          2                                               2               X
  RATED    LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR
  T.O.

    68        1.851         1833.026          0.0             3.536           0.212           3.748
    81        1.499         1851.344          0.0             4.456           0.200           4.656
    93        0.888         1879.510          0.0             5.261           0.317           5.578
     7       45.319         3013.293          7.192           1.684           0.938           2.625
    CAL ID NUMBER:  317   ENGINE TYPE AND MODEL: JT8D-1               SERIAL NUMBER:  P6491858

TEST ORGANIZATION:  S W R I TWA


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL     LB CO /     ENERGY    LB CO /
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE   0.060       840.0    52.051     817.867     1.000      19.00     16.483      258.99     63.642     266.00     0.06197
TAKEOFF     1.000     14000.0     8.724    8500.332     1.000       0.70      0.102       99.17      1.026     163.33     0.00062
CLIMBOUT    0.850     11900.0    16.712    7100.117     1.000       2.20      0.613      260.34      2.354     436.33     0.00140
APPROACH    0.400      5600.0    16.477    3417.406     1.000       4.00      1.098      227.83      4.822     373.33     0.00294
TAXI-IDLE   0.060       840.0    52.051     817.867     1.000       7.00      6.073       95.42     63.642      98.00     0.06197

                                 TOTAL FOR CYCLE:                            24.368      941.74                1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             25.876
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            18.226
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           0.727


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL     LB HC /     ENERGY    LB HC /
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE   0.060       840.0     7.905     817.867     1.000      19.00      2.503      258.99      9.665     266.00     0.00941
TAKEOFF     1.000     14000.0     0.170    8500.332     1.000       0.70      0.002       99.17      0.020     163.33     0.00001
CLIMBOUT    0.850     11900.0     0.142    7100.117     1.000       2.20      0.005      260.34      0.020     436.33     0.00001
APPROACH    0.400      5600.0     0.243    3417.406     1.000       4.00      0.016      227.83      0.071     373.33     0.00004
TAXI-IDLE   0.060       840.0     7.905     817.867     1.000       7.00      0.922       95.42      9.665      98.00     0.00941

                                 TOTAL FOR CYCLE:                             3.449      941.74                1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              3.662
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             2.579
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           0.142


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX         FUEL     LB NOX/     ENERGY    LB NOX/
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE   0.060       840.0     2.007     817.867     1.000      19.00      0.635      258.99      2.454     266.00     0.00239
TAKEOFF     1.000     14000.0    90.146    8500.332     1.000       0.70      1.052       99.17     10.605     163.33     0.00644
CLIMBOUT    0.850     11900.0    60.243    7100.117     1.000       2.20      2.209      260.34      8.485     436.33     0.00506
APPROACH    0.400      5600.0    15.679    3417.406     1.000       4.00      1.045      227.83      4.588     373.33     0.00280
TAXI-IDLE   0.060       840.0     2.007     817.867     1.000       7.00      0.234       95.42      2.454      98.00     0.00239

                                 TOTAL FOR CYCLE:                             5.175      941.74                1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              5.496
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             3.871
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          75.121
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DATE: 8/ 5/71

TEST ORGANIZATION: S W R I TWA

ENGINE SUPPLIER: T W A

ENGINE DATA **

CAL ID NUMBER: 318 ENGINE TYPE AND MODEL: JT8D-1 SERIAL NUMBER: P6491858

RATED THRUST: 14000.

ENGINE TOTAL TIME: 15745. HRS

TIME SINCE HOT SECTION OVERHAUL: 2685. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	11945. HRS
N2 COMPRESSOR OVERHAUL:	11945. HRS
COMBUSTOR CAN REPLACEMENT:	2685. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	11945. HRS
N1 TURBINE OVERHAUL:	11945. HRS
N2 TURBINE OVERHAUL:	11945. HRS

FUEL: JP-4 TF FUEL H/C RATIO: 2.020

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 69.00 FINISH 69.00

ATMOSPHERIC PRESSURE: START 29.11 FINISH 29.11

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0119

RELATIVE HUMIDITY: 66.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 4

COMMENTS:

NO2 DETERMINED BY SUBTRACTION. THIS TEST IS THE LAST OF THREE RUN ON THIS ENGINE. THE FUEL USED CONTAINED THE MINIMUM CONCENTRATION OF CI-2 (0.0125% BY VOLUME).

ELAPSED TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	1/ 0	9680.00	69	7300.00	11010.00	5660.00	116.70	0.013500	-0.00	-0.00	-0.00
3.35	2/ 1	11480.00	81	7730.00	1130.00	6790.00	129.70	0.014500	-0.00	-0.00	-0.00
6.00	3/ 2	12980.00	92	8090.00	11570.00	7870.00	140.40	0.015600	-0.00	-0.00	-0.00
9.00	4/ 3	1040.00	7	2990.00	7300.00	1060.00	35.70	0.008200	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO2 (WET) PPMV	NOX (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
69	858.00	9.80	42.00	2.76	0.0	54.00	3.00	57.00	-0.00	-0.00	-0.00
81	919.00	11.50	35.00	2.96	0.0	69.00	5.00	74.00	-0.00	-0.00	-0.00
92	975.00	13.40	31.00	3.17	0.0	86.00	4.00	90.00	-0.00	-0.00	-0.00
7	658.00	0.70	388.00	1.70	80.00	7.00	9.00	16.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
69	3.03	0.0	0.36	3128.49	6.40	6.75	17.15	0.0	2.01	17707.19	36.22	38.23
81	2.36	0.0	0.55	3129.54	7.63	8.18	15.99	0.0	3.75	21249.57	51.76	55.54
92	1.95	0.0	0.41	3130.18	8.88	9.29	15.33	0.0	3.25	24634.52	69.87	73.12
7	44.29	5.23	1.69	3049.30	1.31	3.00	46.95	5.54	1.79	3232.25	1.39	3.18

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO2 LB/1K#TH-HR	NOX LB/1K#TH-HR
69	1.772	1829.255	0.0	3.741	0.208	3.949
81	1.393	1851.008	0.0	4.511	0.327	4.838
92	1.181	1897.883	0.0	5.383	0.250	5.633
7	45.146	3107.938	5.331	1.338	1.720	3.058

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     CAL ID NUMBER:  318   ENGINE TYPE AND MODEL: JT8D-1                SERIAL NUMBER:  P6491858

TEST ORGANIZATION:  S W R I TWA


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY    LB CO /
            POWER       # TH       RATE       RATE     WT FACTOR     MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.060        840.0    37.916    750.110     1.000       19.00    12.007     237.53     50.548     266.00    0.04514
TAKEOFF     1.000      14000.0    13.041   8619.195     1.000        0.70     0.152     100.56      1.513     163.33    0.00093
CLIMBOUT    0.850      11900.0    15.219   7198.500     1.000        2.20     0.558     263.94      2.114     436.33    0.00128
APPROACH    0.400       5600.0    17.525   3490.320     1.000        4.00     1.168     232.69      5.021     373.33    0.00313
TAXI-IDLE   0.060        840.0    37.916    750.110     1.000        7.00     4.424      87.51     50.548      98.00    0.04514

                                  TOTAL FOR CYCLE:                          18.309     922.24               1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:           19.853
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:          13.694
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         1.087


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY    LB HC /
            POWER       # TH       RATE       RATE     WT FACTOR     MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.060        840.0     6.098    750.110     1.000       19.00     1.931     237.53      8.130     266.00    0.00726
TAKEOFF     1.000      14000.0     0.181   8619.195     1.000        0.70     0.002     100.56      0.021     163.33    0.00001
CLIMBOUT    0.850      11900.0     0.059   7198.500     1.000        2.20     0.002     263.94      0.008     436.33    0.00000
APPROACH    0.400       5600.0     0.437   3490.320     1.000        4.00     0.029     232.69      0.125     373.33    0.00008
TAXI-IDLE   0.060        840.0     6.098    750.110     1.000        7.00     0.711      87.51      8.130      98.00    0.00726

                                  TOTAL FOR CYCLE:                           2.676     922.24               1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            2.902
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           2.001
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         0.151


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY    LB NOX/
            POWER       # TH       RATE       RATE     WT FACTOR     MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.060        840.0     2.051    750.110     1.000       19.00     0.650     237.53      2.734     266.00    0.00244
TAKEOFF     1.000      14000.0    93.047   8619.195     1.000        0.70     1.086     100.56     10.795     163.33    0.00665
CLIMBOUT    0.850      11900.0    61.150   7198.500     1.000        2.20     2.242     263.94      8.495     436.33    0.00514
APPROACH    0.400       5600.0    17.143   3490.320     1.000        4.00     1.143     232.69      4.912     373.33    0.00306
TAXI-IDLE   0.060        840.0     2.051    750.110     1.000        7.00     0.239      87.51      2.734      98.00    0.00244

                                  TOTAL FOR CYCLE:                           5.359     922.24               1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            5.811
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           4.009
                                  LBS POLLUTANT/1000K LB TH AT T.O.:        77.539
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DATE:   7/21/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:  276    ENGINE TYPE AND MODEL:  JT8D-7                        SERIAL NUMBER:   P654564B

                             RATED THRUST:        14000.

     ENGINE TOTAL TIME:                                    0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          0. HRS
          N2 COMPRESSOR OVERHAUL:                          0. HRS
          COMBUSTOR CAN REPLACEMENT:                       0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
          N1 TURBINE OVERHAUL:                             0. HRS
          N2 TURBINE OVERHAUL:                             0. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA *****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   72.00   FINISH   70.00

     ATMOSPHERIC PRESSURE:              START   28.98   FINISH   28.97

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0121

     RELATIVE HUMIDITY:                   58.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:   4

 COMMENTS:

  NO2 DETERMINED BY SUBTRACTION.


 ELAPSED    TEST          POWER                  ENGINE           MEASURED    GAS GEN     CALC     COMPRESSOR    ENGINE     TURBINE
  TIME      MODE    THRUST,LBS  PERCENT          SPEED              FUEL      AIR FLOW     F/A     DISCHARGE    PRESSURE     INLET
                        OR       RATED            RPM               FLOW      LB/SEC                 TEMP        RATIO       TEMP
                       SHP       T.O.       N1          N2          LB/HR                          DEGREES F      EPR      DEGREES F

   0.0      1/ 0     9600.00      68     7210.00   10930.00       5550.00      12.50    0.013700     -0.00        1.64        -0.00
   4.30     2/ 1    11360.00      81     7610.00   11210.00       6620.00     125.00    0.014700     -0.00        1.79        -0.00
  11.00     3/ 2    13000.00      92     8000.00   11490.00       7720.00     136.50    0.015700     -0.00        1.94        -0.00
  20.30     4/ 3     1040.00       7     4140.00    7280.00       1020.00      36.50    0.008000     -0.00       -0.00        -0.00


  POWER    EXHAUST     EXHAUST          CO          CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS          (WET)          2       (WET)     (WET)       2         X
  RATED     TEMP      PRESSURE         PPMV       (WET)      PPMV      PPMV     (WET)     (WET)
  T.O.    DEGREES F     PSIA                    PERCENT V                        PPMV      PPMV

   68       902.00       9.20         21.00       2.72       1.00     83.00      6.00     89.00     -0.00      -0.00      -0.00
   81       960.00      11.20         17.00       2.93       0.0     104.00      6.00    110.00     -0.00      -0.00      -0.00
   92      1020.00      13.20         13.00       3.12       0.0     121.00      2.00    123.00     -0.00      -0.00      -0.00
    7       696.00       0.70        302.00       1.61     140.00      4.00      9.00     13.00     -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2        NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR      LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   68        1.54      0.04      0.72   3130.71      9.99     10.71      8.54      0.23      4.01   17375.43    55.43     59.43
   81        1.16      0.0       0.67   3131.42     11.62     12.29      7.65      0.0       4.44   20730.02    76.92     81.36
   92        0.83      0.0       0.21   3131.94     12.70     12.91      6.41      0.0       1.62   24178.54    98.03     99.65
    7       36.41      9.67      1.78   3049.52      0.79      2.57     37.13      9.86      1.82    3110.51     0.81      2.63


  POWER         CO               CO               THC              NO               NO               NO
 PERCENT                          2                                                  2                X
  RATED    LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

   68          0.889          1809.941           0.024            5.774            0.417            6.191
   81          0.674          1824.826           0.0              6.771            0.391            7.162
   92          0.493          1859.888           0.0              7.540            0.125            7.665
    7         35.706          2990.880           9.480            0.777            1.748            2.525
    CAL ID NUMBER:  276   ENGINE TYPE AND MODEL: JT8D-7               SERIAL NUMBER:  P654564B

TEST ORGANIZATION:  S W R I TWA

  MODE   FRACTIONAL    POWER    EMISSION    FUEL       USAGE    TIME IN     CO        FUEL    LB CO /    ENERGY   LB CO /
            POWER      # TH       RATE      RATE    WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                MIN.      LBS.       LBS.

TAXI-IDLE   0.060      840.0    31.726    764.571    1.000      19.00    10.047     242.11    41.495    266.00   0.03777
TAKEOFF     1.000    14000.0     7.199   8402.617    1.000       0.70     0.084      98.03     0.857    163.33   0.00051
CLIMBOUT    0.850    11900.0     8.193   7077.039    1.000       2.20     0.300     259.49     1.158    436.33   0.00069
APPROACH    0.400     5600.0    16.576   3102.496    1.000       4.00     1.105     206.83     5.343    373.33   0.00296
TAXI-IDLE   0.060      840.0    31.726    764.571    1.000       7.00     3.701      89.20    41.495     98.00   0.03777

                              TOTAL FOR CYCLE:                          15.238     895.67             1337.00
                              LBS POLLUTANT/1K LB FUEL/CYCLE:           17.012
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:          11.397
                              LBS POLLUTANT/1000K LB TH AT T.O.:         0.600

  MODE   FRACTIONAL    POWER    EMISSION    FUEL       USAGE    TIME IN     HC        FUEL    LB HC /    ENERGY   LB HC /
            POWER      # TH       RATE      RATE    WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                MIN.      LBS.       LBS.

TAXI-IDLE   0.060      840.0    11.451    764.571    1.000      19.00     3.626     242.11    14.977    266.00   0.01363
TAKEOFF     1.000    14000.0     0.0     8402.617    1.000       0.70     0.0        98.03     0.0      163.33   0.0
CLIMBOUT    0.850    11900.0     0.130   7077.039    1.000       2.20     0.005     259.49     0.018    436.33   0.00001
APPROACH    0.400     5600.0     0.418   3102.496    1.000       4.00     0.028     206.83     0.135    373.33   0.00007
TAXI-IDLE   0.060      840.0    11.451    764.571    1.000       7.00     1.336      89.20    14.977     98.00   0.01363

                              TOTAL FOR CYCLE:                           4.995     895.67             1337.00
                              LBS POLLUTANT/1K LB FUEL/CYCLE:            5.576
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:           3.736
                              LBS POLLUTANT/1000K LB TH AT T.O.:         0.0

  MODE   FRACTIONAL    POWER    EMISSION    FUEL       USAGE    TIME IN     NOX       FUEL    LB NOX/    ENERGY   LB NOX/
            POWER      # TH       RATE      RATE    WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                MIN.      LBS.       LBS.

TAXI-IDLE   0.060      840.0     1.365    764.571    1.000      19.00     0.432     242.11     1.785    266.00   0.00162
TAKEOFF     1.000    14000.0   111.885   8402.617    1.000       0.70     1.305      98.03    13.315    163.33   0.00799
CLIMBOUT    0.850    11900.0    88.172   7077.039    1.000       2.20     3.233     259.49    12.459    436.33   0.00741
APPROACH    0.400     5600.0    22.662   3102.496    1.000       4.00     1.511     206.83     7.305    373.33   0.00405
TAXI-IDLE   0.060      840.0     1.365    764.571    1.000       7.00     0.159      89.20     1.785     98.00   0.00162

                              TOTAL FOR CYCLE:                           6.640     895.67             1337.00
                              LBS POLLUTANT/1K LB FUEL/CYCLE:            7.414
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:           4.967
                              LBS POLLUTANT/1000K LB TH AT T.O.:        93.237
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DATE:   7/28/71

TEST ORGANIZATION:  S W R I TWA

ENGINF SUPPLIER:    T W A

ENGINF DATA ******************************************************************************************************

     CAL ID NUMBER:  285    ENGINE TYPE AND MODEL:  JT8D-7                    SERIAL NUMBER:   P654074B

                        RATED THRUST:        14000.

     ENGINE TOTAL TIME:                             8438. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIMF SINCE:

          N1 COMPRESSOR OVERHAUL:                   8438. HRS
          N2 COMPRESSOR OVERHAUL:                   8438. HRS
          COMRUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDF VANE OVERHAUL:      0. HRS
          N1 TURRINE OVERHAUL:                      8438. HRS
          N2 TURRINE OVERHAUL:                      8438. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA ***********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   76.00   FINISH   76.00

     ATMOSPHERIC PRESSURE:              START   28.95   FINISH   28.95

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0090

     RELATIVE HUMIDITY:                    42.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMRER OF TESTS:   4

COMMENTS:

 IDLE MODE DATA FOR THF JT8D WERE NORMALLY MEASURED WITH A SINGLE, AXIAL PROBE
 TO PRECEDE DILUTION PROBLEMS (DUE TO EXHAUST PIPE MIXING).  FOR THIS TEST A
 FULL-SIZE PROBE WAS USED AND A CORRECTION FACTOR WAS APPLIED TO RUN #4
 CONCENTRATIONS AS CALCULATED FROM A CARBON BALANCF.  NO2 DETERMINED BY
 SUBTRACTION.


 FLAPSED     TEST           POWER                  ENGINE              MEASURED    GAS GEN      CALC      COMPRESSOR      ENGINE        TURBINE
  TIME       MODE     THRUST,LBS  PERCENT          SPEED                 FUEL      AIR FLOW      F/A      DISCHARGE      PRESSURF        INLET
                          OR        RATED           RPM                  FLOW       LB/SEC                   TEMP          RATIO          TEMP
                          SHP       T.O.       N1          N2            LB/HR                            DEGREES F         EPR         DEGREES F

   0.0       1/ 0      9560.00       68      7210.00   10980.00        5620.00     114.30    0.013700      -0.00           1.65          -0.00
   6.00      2/ 1     11460.00       81      7630.00   11280.00        6750.00     128.50    0.014600      -0.00           1.80          -0.00
  12.00      3/ 2     12880.00       91      7960.00   11580.00        7690.00     138.50    0.015400      -0.00           1.94          -0.00
  16.00      4/ 3       880.00        6      2670.00    6910.00         880.00      32.80    0.007500      -0.00          -0.00          -0.00


 POWER      FXHAUST       FXHAUST         CO          CO         THC       NO         NO          NO       ALDEHYDES    SMOKF   PARTICULATES
PERCENT       GAS           GAS          (WET)         2        (WET)     (WET)        2           X
 RATED        TEMP        PRESSURE       PPMV        (WET)       PPMV      PPMV       (WET)       (WET)
 T.O.      DEGREES F        PSIA                   PERCENT V                          PPMV        PPMV

  68        919.00          9.10         17.00       2.72       5.00      57.00       3.00       60.00      -0.00       -0.00       -0.00
  81        979.00         11.40         11.00       2.95       1.00      75.00       4.00       79.00      -0.00       -0.00       -0.00
  91       1033.00         13.10          8.00       3.05       0.0       95.00       5.00      100.00      -0.00       -0.00       -0.00
   6        702.00          0.50        231.00       1.54      97.00       5.00       6.00       11.00      -0.00       -0.00       -0.00


 POWER     MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
PERCENT       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
 RATED      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
 T.O.      LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

  68         1.25       0.21       0.36    3130.71       6.86       7.22       7.00       1.18       2.03   17594.59      38.54      40.57
  81         0.76       0.04       0.44    3131.97       8.32       8.77       5.02       0.26       3.00   21140.78      56.19      59.18
  91         0.52       0.0        0.54    3132.42      10.20      10.74       4.02       0.0        4.13   24088.31      78.44      82.56
   6        29.29       7.04       1.75    3067.90       1.04       2.29      25.77       6.20       1.10    2699.75       0.92       2.02


 POWER          CO                 CO               THC                NO                NO               NO
PERCENT                             2                                                     2                X
 RATED      LB/1K#TH-HR        LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

  68           0.732            1840.438            0.123             4.032             0.212             4.244
  81           0.438            1844.745            0.023             4.903             0.261             5.164
  91           0.312            1870.210            0.0               6.090             0.321             6.410
   6          29.288            3067.900            7.044             1.041             1.250             2.291
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     CAL ID NUMBER:  285   ENGINE TYPE AND MODEL: JT8D-7              SERIAL NUMBER:  P654074B

TEST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN      CO        FUEL     LB CO /     ENERGY    LB CO /
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR     LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060       840.0    22.619    741.444    1.000      19.00      7.163     234.79     30.507     266.00     0.02693
TAKEOFF     1.000     14000.0     2.927   8321.195    1.000       0.70      0.034      97.08      0.352     163.33     0.00021
CLIMBOUT    0.850     11900.0     4.588   7053.270    1.000       2.20      0.168     258.62      0.650     436.33     0.00039
APPROACH    0.400      5600.0    17.878   3690.958    1.000       4.00      1.192     246.06      4.844     373.33     0.00319
TAXI-IDLE   0.060       840.0    22.619    741.444    1.000       7.00      2.639      86.50     30.507      98.00     0.02693

                                 TOTAL FOR CYCLE:                          11.196     923.06               1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           12.129
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           8.374
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         0.244


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN      HC        FUEL     LB HC /     ENERGY    LB HC /
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR     LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060       840.0     5.450    741.444    1.000      19.00      1.726     234.79      7.351     266.00     0.00649
TAKEOFF     1.000     14000.0     0.0     8321.195    1.000       0.70      0.0        97.08      0.0       163.33     0.0
CLIMBOUT    0.850     11900.0     0.0     7053.270    1.000       2.20      0.0       258.62      0.0       436.33     0.0
APPROACH    0.400      5600.0     4.188   3690.958    1.000       4.00      0.279     246.06      1.135     373.33     0.00075
TAXI-IDLE   0.060       840.0     5.450    741.444    1.000       7.00      0.636      86.50      7.351      98.00     0.00649

                                 TOTAL FOR CYCLE:                           2.641     923.06               1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            2.861
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           1.975
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         0.0


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN      NOX       FUEL     LB NOX/     ENERGY    LB NOX/
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR     LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060       840.0     1.496    741.444    1.000      19.00      0.474     234.79      2.017     266.00     0.00178
TAKEOFF     1.000     14000.0   114.401   8321.195    1.000       0.70      1.335      97.08     13.748     163.33     0.00817
CLIMBOUT    0.850     11900.0    66.817   7053.270    1.000       2.20      2.450     258.62      9.473     436.33     0.00561
APPROACH    0.400      5600.0    17.484   3690.958    1.000       4.00      1.166     246.06      4.737     373.33     0.00312
TAXI-IDLE   0.060       840.0     1.496    741.444    1.000       7.00      0.175      86.50      2.017      98.00     0.00178

                                 TOTAL FOR CYCLE:                           5.598     923.06               1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            6.065
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           4.187
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        95.334
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DATE: 7/12/71

TEST ORGANIZATION: S W R I TWA

ENGINE SUPPLIER: T W A

ENGINE DATA ***

CAL ID NUMBER: 110 ENGINE TYPE AND MODEL: JT8D-9 SERIAL NUMBER: P665244B

RATED THRUST: 14500.

ENGINE TOTAL TIME: 6144. HRS

TIME SINCE HOT SECTION OVERHAUL: 6144. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 6144. HRS
N2 COMPRESSOR OVERHAUL: 6144. HRS
COMBUSTOR CAN REPLACEMENT: 0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 6144. HRS
N1 TURBINE OVERHAUL: 6144. HRS
N2 TURBINE OVERHAUL: 6144. HRS

FUEL: JP-4 TF FUEL H/C RATIO: 2.020

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 80.00 FINISH 80.00

ATMOSPHERIC PRESSURE: START 28.81 FINISH 28.81

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0171

RELATIVE HUMIDITY: 72.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 4

COMMENTS:

ENGINE EQUIPPED WITH SMOKELESS BURNER CANS

ELAPSED TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1.00	1/ 0	9420.00	64	7220.00	11100.00	5400.00	114.60	0.013100	-0.00	1.65	-0.00
15.10	2/ 1	11900.00	82	7740.00	11460.00	6960.00	132.50	0.014600	-0.00	1.86	-0.00
26.30	3/ 2	13690.00	94	8120.00	11630.00	8210.00	145.70	0.015700	-0.00	2.03	-0.00
31.00	4/ 3	990.00	6	4980.00	7110.00	1230.00	43.20	0.007900	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO$_2$ (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO$_2$ (WET) PPMV	NO$_x$ (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
64	921.00	9.00	11.00	2.32	3.00	61.00	3.00	64.00	-0.00	-0.00	-0.00
82	992.00	12.00	14.00	2.75	2.00	94.00	5.00	99.00	-0.00	-0.00	-0.00
94	1065.00	14.40	12.00	3.05	1.00	124.00	8.00	132.00	-0.00	-0.00	-0.00
6	694.00	0.60	161.00	1.67	50.00	3.00	5.00	8.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
64	0.94	0.15	0.42	3131.35	8.61	9.03	5.10	0.80	2.29	16909.30	46.48	48.76
82	1.01	0.08	0.60	3131.42	11.19	11.78	7.06	0.58	4.14	21794.68	77.88	82.02
94	0.78	0.04	0.85	3131.91	13.31	14.17	6.44	0.31	7.05	25712.95	109.28	116.33
6	18.99	3.38	0.97	3094.15	0.58	1.55	23.35	4.15	1.19	3805.80	0.71	1.91

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO$_2$ LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO$_2$ LB/1K#TH-HR	NO$_x$ LB/1K#TH-HR
64	0.542	1735.042	0.085	4.934	0.243	5.177
82	0.593	1831.485	0.049	6.545	0.348	6.893
94	0.470	1878.229	0.022	7.983	0.515	8.498
6	23.587	3844.245	4.195	0.722	1.203	1.925

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    CAL ID NUMBER:  110   ENGINE TYPE AND MODEL: JT8D-9                SERIAL NUMBER:  P6652448

TEST ORGANIZATION:  S W R I TWA


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL     LB CO /     ENERGY    LB CO /
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060       870.0    58.225    1015.298     1.000      19.00     18.438      321.51     57.348     275.50     0.06693
TAKEOFF     1.000     14500.0     6.633    9006.500     1.000       0.70      0.077      105.08      0.736     169.17     0.00046
CLIMBOUT    0.850     12325.0     7.094    7098.297     1.000       2.20      0.260      260.27      0.999     451.92     0.00058
APPROACH    0.400      5800.0     3.360    3854.013     1.000       4.00      0.224      256.93      0.872     386.67     0.00058
TAXI-IDLE   0.060       870.0    58.225    1015.298     1.000       7.00      6.793      118.45     57.348     101.50     0.06693

                                TOTAL FOR CYCLE:                            25.792     1062.24                1384.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             24.281
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:            18.626
                                LBS POLLUTANT/1000K LB TH AT T.O.:           0.534


  MODF    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL     LB HC /     ENERGY    LB HC /
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060       870.0    29.431    1015.298     1.000      19.00      9.320      321.51     28.988     275.50     0.03383
TAKEOFF     1.000     14500.0     0.076    9006.500     1.000       0.70      0.001      105.08      0.008     169.17     0.00001
CLIMBOUT    0.850     12325.0     0.473    7098.297     1.000       2.20      0.017      260.27      0.067     451.92     0.00004
APPROACH    0.400      5800.0     0.657    3854.013     1.000       4.00      0.044      256.93      0.171     386.67     0.00011
TAXI-IDLE   0.060       870.0    29.431    1015.298     1.000       7.00      3.434      118.45     28.988     101.50     0.03383

                                TOTAL FOR CYCLE:                            12.816     1062.24                1384.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             12.065
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:             9.255
                                LBS POLLUTANT/1000K LB TH AT T.O.:           0.061


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      NOX        FUEL     LB NOX/     ENERGY    LB NOX/
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060       870.0     1.389    1015.298     1.000      19.00      0.440      321.51      1.368     275.50     0.00160
TAKEOFF     1.000     14500.0   136.096    9006.500     1.000       0.70      1.588      105.08     15.111     169.17     0.00939
CLIMBOUT    0.850     12325.0    87.427    7098.297     1.000       2.20      3.206      260.27     12.317     451.92     0.00709
APPROACH    0.400      5800.0    22.224    3854.013     1.000       4.00      1.482      256.93      5.767     386.67     0.00383
TAXI-IDLE   0.060       870.0     1.389    1015.298     1.000       7.00      0.162      118.45      1.368     101.50     0.00160

                                TOTAL FOR CYCLE:                             6.877     1062.24                1384.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:              6.474
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:             4.966
                                LBS POLLUTANT/1000K LB TH AT T.O.:         109.503
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DATE:   7/14/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  112    ENGINE TYPE AND MODEL:  JT8D-9                 SERIAL NUMBER:   P665338B

                            RATED THRUST:        14500.

     ENGINE TOTAL TIME:                             5839. HRS

     TIME SINCE HOT SECTION OVERHAUL:               3343. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                   5839. HRS
          N2 COMPRESSOR OVERHAUL:                   5839. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:   3343. HRS
          N1 TURBINE OVERHAUL:                      5839. HRS
          N2 TURBINE OVERHAUL:                      5839. HRS

     FUEL: JP-4 TF             FUEL H/C RATIO:   2.020

OPERATIONAL DATA ************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   70.00   FINISH   75.00

     ATMOSPHERIC PRESSURE:              START   28.92   FINISH   28.92

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0131

     RELATIVE HUMIDITY:                   74.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

 F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
 DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.


 ELAPSED    TEST          POWER              ENGINE        MEASURED   GAS GEN     CALC    COMPRESSOR   ENGINE     TURBINE
  TIME      MODE    THRUST,LBS  PERCENT      SPEED           FUEL     AIR FLOW    F/A     DISCHARGE   PRESSURE     INLET
                        OR       RATED        RPM            FLOW     LB/SEC                 TEMP       RATIO       TEMP
                       SHP       T.O.     N1        N2       LB/HR                        DEGREES F     EPR      DEGREES F

   0.0      1/ 0     9350.00      64    7110.00  10830.00   5350.00   115.00   0.012900     -0.00       1.64       -0.00
  11.00     2/ 1    11320.00      78    7520.00  11240.00   6520.00   129.30   0.013400     -0.00       1.82       -0.00
  26.00     3/ 2    13740.00      94    8090.00  11630.00   8250.00   147.40   0.015600     -0.00       2.04       -0.00
  31.30     4/ 3      840.00       5    2610.00   6870.00   1010.00    35.50   0.007900     -0.00      -0.00       -0.00
  38.30     5/ 4    13320.00      91    7940.00  11590.00   7800.00   144.50   0.015000     -0.00      -0.00       -0.00


  POWER    EXHAUST     EXHAUST        CO        CO       THC      NO       NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS        (WET)       2       (WET)    (WET)      2        X
  RATED     TEMP      PRESSURE      PPMV     (WET)      PPMV     PPMV    (WET)    (WET)
  T.O.    DEGREES F     PSIA                PERCENT V                    PPMV     PPMV

   64      861.00       9.10        6.00     1.99      1.00     63.00    6.00     69.00     -0.00     -0.00     -0.00
   78      926.00      11.30       12.00     2.13      0.0      85.00    6.00     91.00     -0.00     -0.00     -0.00
   94     1017.00      14.80        9.00     2.38      0.0     121.00    7.00    128.00     -0.00     -0.00     -0.00
    5      659.00       0.50      260.00     1.57     80.00      3.00    9.00     12.00     -0.00     -0.00     -0.00
   91     1012.00      14.20       12.00     2.36      2.00    111.00    6.00    117.00     -0.00     -0.00     -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   64        0.60      0.06      0.99   3132.14     10.37     11.35      3.22      0.31      5.28  16756.95     55.46     60.74
   78        1.12      0.0       0.92   3131.48     13.06     13.99      7.32      0.0       6.01  20417.21     85.18     91.19
   94        0.75      0.0       0.96   3132.06     16.65     17.61      6.22      0.0       7.94  25839.47    137.33    145.28
    5       32.32      5.70      1.84   3066.83      0.61      2.45     32.65      5.75      1.86   3097.49      0.62      2.47
   91        1.01      0.10      0.83   3131.39     15.40     16.23      7.90      0.75      6.49  24424.80    120.09    126.59


  POWER          CO              CO              THC              NO               NO               NO
 PERCENT                          2                                                  2                X
  RATED     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

   64          0.344          1792.187          0.033            5.931            0.565            6.496
   78          0.647          1803.641          0.0              7.524            0.531            8.056
   94          0.453          1880.602          0.0              9.995            0.578           10.573
    5         38.866          3687.493          6.845            0.737            2.210            2.946
   91          0.593          1833.694          0.057            9.016            0.487            9.503
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    CAL ID NUMBER:  112   ENGINE TYPE AND MODEL: JT8D-9               SERIAL NUMBER:  P665338B

TEST ORGANIZATION:  S W R I TWA

   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     CO       FUEL     LB CO /    ENERGY   LB CO /
              POWER       # TH     RATE      RATE     WT FACTOR    MODE     MASS      MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                 MIN.     LBS.      LBS.

TAXI-IDLE    0.060       870.0   33.973   1052.542     1.000      19.00   10.758    333.30     32.277    275.50    0.03905
TAKEOFF      1.000     14500.0    2.290   8850.086     1.000       0.70    0.027    103.25      0.259    169.17    0.00016
CLIMBOUT     0.850     12325.0    8.284   7225.609     1.000       2.20    0.304    264.94      1.146    451.92    0.00067
APPROACH     0.400      5800.0    2.076   3802.475     1.000       4.00    0.138    253.50      0.546    386.67    0.00036
TAXI-IDLE    0.060       870.0   33.973   1052.542     1.000       7.00    3.964    122.80     32.277    101.50    0.03905
                                TOTAL FOR CYCLE:                          15.190   1077.79               1384.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:           14.094
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:          10.970
                                LBS POLLUTANT/1000K LB TH AT T.O.:         0.184

   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     HC       FUEL     LB HC /    ENERGY   LB HC /
              POWER       # TH     RATE      RATE     WT FACTOR    MODE     MASS      MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                 MIN.     LBS.      LBS.

TAXI-IDLE    0.060       870.0    7.929   1052.542     1.000      19.00    2.511    333.30      7.533    275.50    0.00911
TAKEOFF      1.000     14500.0    0.0     8850.086     1.000       0.70    0.0      103.25      0.0      169.17    0.0
CLIMBOUT     0.850     12325.0    0.0     7225.609     1.000       2.20    0.0      264.94      0.0      451.92    0.0
APPROACH     0.400      5800.0    0.167   3802.475     1.000       4.00    0.011    253.50      0.044    386.67    0.00003
TAXI-IDLE    0.060       870.0    7.929   1052.542     1.000       7.00    0.925    122.80      7.533    101.50    0.00911
                                TOTAL FOR CYCLE:                           3.447   1077.79               1384.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            3.198
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           2.489
                                LBS POLLUTANT/1000K LB TH AT T.O.:         0.0

   MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     NOX      FUEL     LB NOX/    ENERGY   LB NOX/
              POWER       # TH     RATE      RATE     WT FACTOR    MODE     MASS      MASS   1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR     LB/HR                 MIN.     LBS.      LBS.

TAXI-IDLE    0.060       870.0    2.467   1052.542     1.000      19.00    0.781    333.30      2.344    275.50    0.00284
TAKEOFF      1.000     14500.0  188.728   8850.086     1.000       0.70    2.202    103.25     21.325    169.17    0.01302
CLIMBOUT     0.850     12325.0  107.472   7225.609     1.000       2.20    3.941    264.94     14.874    451.92    0.00872
APPROACH     0.400      5800.0   27.671   3802.475     1.000       4.00    1.845    253.50      7.277    386.67    0.00477
TAXI-IDLE    0.060       870.0    2.467   1052.542     1.000       7.00    0.288    122.80      2.344    101.50    0.00284
                                TOTAL FOR CYCLE:                           9.056   1077.79               1384.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:            8.403
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:           6.540
                                LBS POLLUTANT/1000K LB TH AT T.O.:       151.850
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DATE: 7/16/71

TEST ORGANIZATION: S W R I TWA

ENGINE SUPPLIER: T W A

ENGINE DATA **

CAL ID NUMBER: 114 ENGINE TYPE AND MODEL: JT8D-9 SERIAL NUMBER: P665244B

RATED THRUST: 14500.

ENGINE TOTAL TIME: 6144. HRS

TIME SINCE HOT SECTION OVERHAUL: 6144. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	6144. HRS
N2 COMPRESSOR OVERHAUL:	6144. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	6144. HRS
N1 TURBINE OVERHAUL:	6144. HRS
N2 TURBINE OVERHAUL:	6144. HRS

FUEL: JP-4 TF FUEL H/C RATIO: 2.020

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 80.00 FINISH 82.00

ATMOSPHERIC PRESSURE: START 28.94 FINISH 28.94

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0133

RELATIVE HUMIDITY: 56.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.0C, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 5

COMMENTS:

F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN. NO2 DETERMINED BY SUBTRACTION.

ELAPSED TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	1/ 0	9580.00	66	7200.00	10810.00	5680.00	116.10	0.013600	-0.00	-0.00	-0.00
3.00	2/ 1	11340.00	78	7580.00	11160.00	6640.00	129.00	0.014300	-0.00	-0.00	-0.00
11.00	3/ 2	13540.00	93	8110.00	11550.00	8190.00	145.00	0.015700	-0.00	-0.00	-0.00
19.00	4/ 3	760.00	5	2570.00	6630.00	880.00	28.80	0.008500	-0.00	-0.00	-0.00
31.00	5/ 4	13680.00	94	8120.00	11580.00	8350.00	145.00	0.015900	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
66	905.00	9.10	13.00	2.38	0.0	70.00	4.00	74.00	-0.00	-0.00	-0.00
78	966.00	11.20	14.00	2.42	0.0	89.00	4.00	93.00	-0.00	-0.00	-0.00
93	1070.00	14.20	12.00	2.63	0.0	120.00	7.00	127.00	-0.00	-0.00	-0.00
5	691.00	0.50	333.00	1.67	146.00	3.00	9.00	12.00	-0.00	-0.00	-0.00
94	1053.00	14.30	13.00	2.69	0.0	122.00	5.00	127.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
66	1.09	0.0	0.55	3131.53	9.63	10.18	6.18	0.0	3.13	17787.08	54.69	57.82
78	1.15	0.0	0.54	3131.43	12.04	12.58	7.66	0.0	3.59	20792.69	79.94	83.53
93	0.91	0.0	0.87	3131.91	14.94	15.81	7.45	0.0	7.14	25649.53	122.35	129.48
5	38.65	9.71	1.72	3045.88	0.57	2.29	34.02	8.54	1.51	2680.37	0.50	2.01
94	0.96	0.0	0.61	3131.73	14.85	15.46	8.04	0.0	5.08	26149.91	123.98	129.06

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_x LB/1K#TH-HR
66	0.645	1856.689	0.0	5.709	0.326	6.035
78	0.675	1833.571	0.0	7.049	0.317	7.366
93	0.550	1894.352	0.0	9.036	0.527	9.563
5	44.758	3526.806	11.239	0.662	1.987	2.649
94	0.599	1911.543	0.0	9.063	0.371	9.434

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    CAL ID NUMBER:  114   ENGINE TYPE AND MODEL: JT8D-9                  SERIAL NUMBER:  P6652448

TEST ORGANIZATION:  S W R I TWA

  MODE     FRACTIONAL     POWER    EMISSION    FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY   LB CO /
              POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                    LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060        870.0    32.774    922.494     1.000      19.00     10.379     292.12     35.528     275.50    0.03767
TAKEOFF     1.000      14500.0     7.734   9035.027     1.000       0.70      0.090     105.41      0.856     169.17    0.00053
CLIMBOUT    0.850      12325.0     6.439   7522.078     1.000       2.20      0.236     275.81      0.856     451.92    0.00052
APPROACH    0.400       5800.0     4.421   3780.560     1.000       4.00      0.295     252.04      1.169     386.67    0.00076
TAXI-IDLE   0.060        870.0    32.774    922.494     1.000       7.00      3.824     107.62     35.528     101.50    0.03767

                                  TOTAL FOR CYCLE:                           14.823    1033.00               1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            14.350
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           10.705
                                  LBS POLLUTANT/1000K LB TH AT T.O.:          0.622

  MODE     FRACTIONAL     POWER    EMISSION    FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY   LB HC /
              POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                    LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060        870.0     4.289    922.494     1.000      19.00     1.358      292.12      4.649     275.50    0.00493
TAKEOFF     1.000      14500.0     0.0     9035.027     1.000       0.70     0.0        105.41      0.0       169.17    0.0
CLIMBOUT    0.850      12325.0     0.0     7522.078     1.000       2.20     0.0        275.81      0.0       451.92    0.0
APPROACH    0.400       5800.0     0.153   3780.560     1.000       4.00     0.010      252.04      0.041     386.67    0.00003
TAXI-IDLE   0.060        870.0     4.289    922.494     1.000       7.00     0.500      107.62      4.649     101.50    0.00493

                                  TOTAL FOR CYCLE:                           1.869     1033.00               1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            1.809
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           1.350
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         0.0

  MODE     FRACTIONAL     POWER    EMISSION    FUEL       USAGE     TIME IN      NOX       FUEL     LB NOX/     ENERGY   LB NOX/
              POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                    LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060        870.0     2.128    922.494     1.000      19.00      0.674     292.12      2.306     275.50    0.00245
TAKEOFF     1.000      14500.0   150.332   9035.027     1.000       0.70      1.754     105.41     16.639     169.17    0.01037
CLIMBOUT    0.850      12325.0   103.709   7522.078     1.000       2.20      3.803     275.81     13.787     451.92    0.00841
APPROACH    0.400       5800.0    24.128   3780.560     1.000       4.00      1.609     252.04      6.382     386.67    0.00416
TAXI-IDLE   0.060        870.0     2.128    922.494     1.000       7.00      0.248     107.62      2.306     101.50    0.00245

                                  TOTAL FOR CYCLE:                            8.087    1033.00               1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:             7.829
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:            5.840
                                  LBS POLLUTANT/1000K LB TH AT T.O.:        120.956
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DATE:   7/15/71

TEST ORGANIZATION:  S W R I TWA

FNGINE SUPPLIER:    T W A

ENGINE DATA ************************************************************************************************************

     CAL ID NUMBER:  275    ENGINE TYPE AND MODEL:  JT8D-9                      SERIAL NUMBER:   P6653368

                            RATED THRUST:        14500.

     ENGINE TOTAL TIME:                                5923. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      5923. HRS
          N2 COMPRESSOR OVERHAUL:                      5923. HRS
          COMBUSTOR CAN REPLACEMENT:                      0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
          N1 TURBINE OVERHAUL:                         5923. HRS
          N2 TURBINE OVERHAUL:                         5923. HRS

     FUEL: JP-4 TF               FUEL H/C RATIO:   2.020

OPERATIONAL DATA ********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   82.00   FINISH   80.00

     ATMOSPHERIC PRESSURE:              START   28.88   FINISH   28.88

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0123

     RELATIVE HUMIDITY:                         53.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

NO2 DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.


 ELAPSED   TEST           POWER                  ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE      TURBINE
  TIME     MODE    THRUST,LBS  PERCENT            SPEED               FUEL     AIR FLOW     F/A      DISCHARGE     PRESSURE      INLET
                       OR       RATED              RPM                FLOW      LB/SEC                  TEMP         RATIO        TEMP
                      SHP       T.O.          N1          N2          LB/HR                          DEGREES F        EPR      DEGREES F

   0.0     1/ 0    9500.00        65     7330.00  10930.00      5600.00     114.20    0.014000       -0.00          1.65        -0.00
  15.00    2/ 1   11850.00        81     7730.00  11370.00      7000.00     132.10    0.014700       -0.00          1.86        -0.00
  32.00    3/ 2   13500.00        93     8120.00  11620.00      8160.00     144.40    0.015700       -0.00          2.01        -0.00
  37.00    4/ 3     920.00         6     2750.00   7020.00       930.00      32.60    0.007900       -0.00         -0.00        -0.00
  42.00    5/ 4   12750.00        87     7900.00  11450.00      7700.00     138.70    0.015400       -0.00         -0.00        -0.00


 POWER     EXHAUST     EXHAUST         CO          CO        THC       NO        NO         NO      ALDEHYDES    SMOKE    PARTICULATES
PERCENT      GAS         GAS          (WET)         2       (WET)     (WET)       2          X
 RATED      TEMP      PRESSURE        PPMV       (WET)      PPMV      PPMV      (WET)      (WET)
 T.O.    DEGREES F      PSIA                   PERCENT V                         PPMV       PPMV

   65      919.00        9.10         11.00       2.83      10.00     70.00      5.00      75.00     -0.00      -0.00       -0.00
   81      985.00       12.00          8.00       2.97      10.00    100.00      6.00     106.00     -0.00      -0.00       -C.00
   93     1046.00       14.20          6.00       3.15      10.00    125.00      6.00     131.00     -0.00      -0.00       -0.00
    6      680.00        0.60        269.00       1.61      80.00      5.00      7.00      12.00     -0.00      -0.00       -0.00
   87     1017.00       13.10          7.00       3.10      14.00    108.00      5.00     113.00     -0.00      -0.00       -0.00


 POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
 RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
 T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   65       0.77       0.40       0.58    3130.92       8.10       8.67       4.34       2.26       3.24   17533.14      45.34      48.58
   81       0.56       0.38       0.66    3131.34      11.02      11.68       3.76       2.69       4.63   21919.41      77.15      81.78
   93       0.38       0.36       0.62    3131.65      12.99      13.61       3.10       2.96       5.09   25554.26     106.01     111.10
    6      32.41       5.55       1.39    3066.77       1.00       2.39      30.33       5.17       1.30    2852.09       0.93       2.22
   87       0.45       0.52       0.53    3131.12      11.40      11.93       3.46       3.97       4.07   24109.62      87.81      91.87


 POWER          CO                CO                THC                NO                NO               NO
PERCENT                            2                                                       2                X
 RATED    LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

   65        0.457           1945.594             0.238             4.772             0.341            5.113
   81        0.317           1849.739             0.227             6.511             0.391            6.901
   93        0.229           1892.908             0.219             7.853             0.377            8.229
    6       32.966           3100.100             5.615             1.006             1.409            2.416
   87        0.272           1930.950             0.311             6.887             0.319            7.206
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     CAL ID NUMBER:  275   ENGINE TYPE AND MODEL: JT8D-9                SERIAL NUMBER:  P665336B

TEST ORGANIZATION:  S W R I TWA


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL      LB CO /     ENERGY   LB CO /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060       870.0    29.587     783.840     1.000       19.00      9.369      248.22     37.746     275.50     0.03401
TAKEOFF     1.000     14500.0     2.419    8639.344     1.000        0.70      0.028      100.79      0.280     169.17     0.00017
CLIMBOUT    0.850     12325.0     2.917    7472.914     1.000        2.20      0.107      274.01      0.390     451.92     0.00024
APPROACH    0.400      5800.0    13.551    5018.750     1.000        4.00      0.903      334.58      2.700     386.67     0.00234
TAXI-IDLE   0.060       870.0    29.587     783.840     1.000        7.00      3.452       91.45     37.746     101.50     0.03401

                                 TOTAL FOR CYCLE:                            13.860     1049.05                1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             13.212
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            10.009
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           0.195


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL      LB HC /     ENERGY   LB HC /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060       870.0     4.596     783.840     1.000       19.00      1.455      248.22      5.863     275.50     0.00528
TAKEOFF     1.000     14500.0     3.607    8639.344     1.000        0.70      0.042      100.79      0.417     169.17     0.00025
CLIMBOUT    0.850     12325.0     3.255    7472.914     1.000        2.20      0.119      274.01      0.436     451.92     0.00026
APPROACH    0.400      5800.0     4.001    5018.750     1.000        4.00      0.267      334.58      0.797     386.67     0.00069
TAXI-IDLE   0.060       870.0     4.596     783.840     1.000        7.00      0.536       91.45      5.863     101.50     0.00528

                                 TOTAL FOR CYCLE:                             2.420     1049.05                1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              2.306
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             1.747
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           2.902


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      NOX        FUEL      LB NOX/     ENERGY   LB NOX/
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060       870.0     1.713     783.840     1.000       19.00      0.543      248.22      2.186     275.50     0.00197
TAKEOFF     1.000     14500.0   139.669    8639.344     1.000        0.70      1.629      100.79     16.167     169.17     0.00963
CLIMBOUT    0.850     12325.0    89.342    7472.914     1.000        2.20      3.276      274.01     11.956     451.92     0.00725
APPROACH    0.400      5800.0    30.155    5018.750     1.000        4.00      2.010      334.58      6.009     386.67     0.00520
TAXI-IDLE   0.060       870.0     1.713     783.840     1.000        7.00      0.200       91.45      2.186     101.50     0.00197

                                 TOTAL FOR CYCLE:                             7.658     1049.05                1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              7.300
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             5.530
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         112.377
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DATE:   7/22/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  277    ENGINE TYPE AND MODEL:  JT8D-9                           SERIAL NUMBER:   P66516581

                             RATED THRUST:          14500.

     ENGINE TOTAL TIME:                                     8082. HRS

     TIME SINCE HOT SECTION OVERHAUL:                       3142. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                           8082. HRS
          N2 COMPRESSOR OVERHAUL:                           8082. HRS
          COMBUSTOR CAN REPLACEMENT:                        3142. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:           3140. HRS
          N1 TURBINE OVERHAUL:                              8082. HRS
          N2 TURBINE OVERHAUL:                              8082. HRS

     FUEL: JP-4 TF               FUEL H/C RATIO:   2.020

OPERATIONAL DATA ***************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   77.00   FINISH   77.00

     ATMOSPHERIC PRESSURE:              START   28.84   FINISH   28.84

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0164

     RELATIVE HUMIDITY:                    79.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.0C,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:   5

 COMMENTS:

  F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
  DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.


                                                                                                          TURBINE
                                                                          CALC    COMPRESSOR   ENGINE     INLET
 ELAPSED   TEST        POWER            ENGINE         MEASURED  GAS GEN   F/A    DISCHARGE    PRESSURE   TEMP
 TIME      MODE  THRUST,LBS  PERCENT    SPEED          FUEL      AIR FLOW           TEMP       RATIO      DEGREES F
                    OR       RATED      RPM            FLOW      LB/SEC           DEGREES F    EPR
                    SHP      T.O.    N1        N2      LB/HR

   0.0     1/ 0   9540.00    65   7210.00  10950.00   5220.00  118.50  0.012200    -0.00       1.64      -0.00
   4.35    2/ 1  11340.00    79   7600.00  11200.00   6230.00  131.50  0.013200    -0.00       1.81      -0.00
   7.50    3/ 2  13580.00    93   8160.00  11570.00   7760.00  144.00  0.015000    -0.00       2.02      -0.00
  11.10    4/ 3    640.00     5   2960.00   6840.00    840.00   27.10  0.008600    -0.00      -0.00      -0.00
  17.40    5/ 4  12970.00    89   8020.00  11460.00   7340.00  143.50  0.014200    -0.00      -0.00      -0.00


                                                                    NO       NO     ALDEHYDES   SMOKE   PARTICULATES
 POWER    EXHAUST    EXHAUST       CO      CO      THC      NO        2        x
 PERCENT  GAS        GAS          (WET)      2     (WET)    (WET)    (WET)    (WET)
 RATED    TEMP       PRESSURE     PPMV    (WET)    PPMV     PPMV     PPMV     PPMV
 T.O.     DEGREES F  PSIA                 PERCENT V

   65     985.00      9.10       19.00    2.46     1.00    58.00    5.00     63.00    -0.00     -0.00     -0.00
   79     947.00     11.40       14.00    2.65     0.0     73.00    5.00     78.00    -0.00     -0.00     -0.00
   93    1032.00     14.30       11.00    2.99     0.0    102.00    4.00    106.00    -0.00     -0.00     -0.00
    5     695.00      0.40      282.00    1.71    96.00     2.00    8.00     10.00    -0.00     -0.00     -0.00
   89    1005.00     13.50       11.00    2.84     2.00    93.00    4.00     97.00    -0.00     -0.00     -0.00


                                                                                   MASS EMI  MASS EMI  MASS EMI  MASS EMI
 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  NO2       CO2       NO        NOX
 PERCENT  CO        HC        NO2       CO2       NO        NOX       CO        HC        LB/HR     LB/HR     LB/HR     LB/HR
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   65      1.54      0.05      0.67    3130.70     7.72      8.38      8.03      0.24      3.47   16342.23    40.26     43.75
   78      1.05      0.0       0.62    3131.59     9.02      9.64      6.56      0.0       3.85   19509.78    56.18     60.03
   93      0.73      0.0       0.44    3132.09    11.17     11.61      5.69      0.0       3.40   24305.00    86.68     90.03
    5     32.17      6.27      1.50    3065.48     0.37      1.87     27.03      5.27      1.26    2575.00     0.31      1.57
   89      0.77      0.08      0.46    3131.81    10.72     11.18      5.67      0.55      3.38   22987.46    78.69     82.08


                                                                            NO             NO
 POWER        CO               CO             THC             NO              2              x
 PERCENT                         2         LB/1K*TH-HR     LB/1K*TH-HR     LB/1K*TH-HR    LB/1K*TH-HR
 RATED     LB/1K*TH-HR      LB/1K*TH-HR
 T.O.

   65          0.842          1713.022        0.025           4.222          0.364          4.586
   78          0.578          1720.439        0.0             4.954          0.334          5.294
   93          0.419          1749.764        0.0             6.383          0.250          6.633
    5         32.175          3065.473        6.273           0.375          1.499          1.874
   89          0.437          1772.357        0.045           6.067          0.261          6.328
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     CAL ID NUMBER:  277   ENGINE TYPE AND MODEL: JT8D-9                  SERIAL NUMBER:  P665165B1

TEST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     CO        FUEL     LB CO /    ENERGY    LB CO /
             POWER      # TH       RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR     LB/HR                  MIN.     LBS.       LBS.

TAXI-IDLE   0.060       870.0    26.890    738.739    1.000       19.00     8.515     233.93     36.399    275.50    0.03091
TAKEOFF     1.000     14500.0     4.718   8701.129    1.000        0.70     0.055     101.51      0.542    169.17    0.00033
CLIMBOUT    0.850     12325.0     6.153   7056.152    1.000        2.20     0.226     258.73      0.872    451.92    0.00050
APPROACH    0.400      5800.0    15.519   3453.174    1.000        4.00     1.035     230.21      4.494    386.67    0.00268
TAXI-IDLE   0.060       870.0    26.890    738.739    1.000        7.00     3.137      86.19     36.399    101.50    0.03091

                                 TOTAL FOR CYCLE:                          12.967     910.57               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           14.241
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           9.364
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         0.380


  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     HC        FUEL     LB HC /    ENERGY    LB HC /
             POWER      # TH       RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR     LB/HR                  MIN.     LBS.       LBS.

TAXI-IDLE   0.060       870.0     4.957    738.739    1.000       19.00     1.570     233.93      6.711    275.50    0.00570
TAKEOFF     1.000     14500.0     0.148   8701.129    1.000        0.70     0.002     101.51      0.017    169.17    0.00001
CLIMBOUT    0.850     12325.0     0.363   7056.152    1.000        2.20     0.013     258.73      0.051    451.92    0.00003
APPROACH    0.400      5800.0     0.913   3453.174    1.000        4.00     0.061     230.21      0.264    386.67    0.00016
TAXI-IDLE   0.060       870.0     4.957    738.739    1.000        7.00     0.578      86.19      6.711    101.50    0.00570

                                 TOTAL FOR CYCLE:                           2.224     910.57               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            2.443
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           1.606
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         0.119


  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     NOX       FUEL     LB NOX/    ENERGY    LB NOX/
             POWER      # TH       RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR     LB/HR                  MIN.     LBS.       LBS.

TAXI-IDLE   0.060       870.0     1.303    738.739    1.000       19.00     0.413     233.93      1.764    275.50    0.00150
TAKEOFF     1.000     14500.0   106.342   8701.129    1.000        0.70     1.241     101.51     12.222    169.17    0.00733
CLIMBOUT    0.850     12325.0    75.212   7056.152    1.000        2.20     2.758     258.73     10.659    451.92    0.00610
APPROACH    0.400      5800.0    17.951   3453.174    1.000        4.00     1.197     230.21      5.199    386.67    0.00310
TAXI-IDLE   0.060       870.0     1.303    738.739    1.000        7.00     0.152      86.19      1.764    101.50    0.00150

                                 TOTAL FOR CYCLE:                           5.760     910.57               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            6.326
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           4.160
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        85.563
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DATE:   7/22/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:   T W A

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:  278    ENGINE TYPE AND MODEL:  JT8D-9                    SERIAL NUMBER:   P66516582

                          RATED THRUST:        14500.

     ENGINE TOTAL TIME:                                8082. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  3142. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      8082. HRS
          N2 COMPRESSOR OVERHAUL:                      8082. HRS
          COMBUSTOR CAN REPLACEMENT:                   3142. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      3140. HRS
          N1 TURBINE OVERHAUL:                         8082. HRS
          N2 TURBINE OVERHAUL:                         8082. HRS

     FUEL: JP-4 TW               FUEL H/C RATIO:   2.020

OPERATIONAL DATA ************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   77.00   FINISH   76.00

     ATMOSPHERIC PRESSURE:              START   28.78   FINISH   28.78

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0174

     RELATIVE HUMIDITY:                  79.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:   5

 COMMENTS:

  F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
  DETERMINED BY SUBTRACTION.


  ELAPSED    TEST           POWER              ENGINE           MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE     TURBINE
   TIME      MODE    THRUST,LBS  PERCENT        SPEED              FUEL    AIR FLOW    F/A      DISCHARGE    PRESSURE     INLET
                         OR       RATED          RPM               FLOW     LB/SEC                TEMP        RATIO       TEMP
                         SHP      T.O.       N1        N2          LB/HR                        DEGREES F     EPR      DEGREES F

    0.0      1/ 0     9480.00       65    7220.00  10800.00      5200.00    111.70   0.012900     -0.00        1.65        -0.00
    4.40     2/ 1    11900.00       82    7750.00  11270.00      6620.00    124.20   0.014300     -0.00        1.86        -0.00
   10.15     3/ 2    13680.00       94    8220.00  11600.00      7910.00    141.00   0.015600     -0.00        2.04        -0.00
   14.25     4/ 3      850.00        5    2630.00   6860.00       840.00     29.40   0.008200     -0.00       -0.00        -0.00
   16.20     5/ 4    12540.00       86    7970.00  11210.00      7100.00    131.00   0.014800     -0.00       -0.00        -0.00


  POWER     EXHAUST      EXHAUST         CO         CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT      GAS          GAS          (WET)        2       (WET)     (WET)       2         X
  RATED      TEMP       PRESSURE        PPMV      (WET)      PPMV      PPMV     (WET)     (WET)
  T.O.    DEGREES F       PSIA                   PERCENT V                      PPMV      PPMV

   65       891.30        9.10         25.00       2.56      0.0      56.00      5.00     61.00     -0.00      -0.00      -0.00
   82       958.30       12.10         17.00       2.81      0.0      76.00      6.00     82.00     -0.00      -0.00      -0.00
   94      1059.00       14.60         14.00       3.27      0.0     101.00      5.00    106.00     -0.00      -0.00      -0.00
    5       673.90        8.50        274.00       1.64     39.00      3.00      8.00     11.00     -0.00      -0.00      -0.00
   86       990.30       12.90         15.00       2.92      0.0      92.00      6.00     98.00     -0.00      -0.00      -0.00


  POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2         NO        NOX         CO         HC        NO2        CO2         NO        NOX
  RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   65        1.87       0.0        0.64     3130.31      7.16       7.80       9.71       0.0        3.32    16277.59     37.22      40.55
   82        1.21       0.0        0.70     3131.35      8.85       9.55       7.98       0.0        4.63    20729.51     58.61      63.24
   94        0.91       0.0        0.53     3131.81     10.77      11.30       7.19       0.0        4.22    24772.63     85.20      89.42
    5       32.58       6.67       1.55     3063.75      0.59       2.15      27.37       5.61       1.31     2573.55      0.49       1.80
   86        1.09       0.0        0.67     3131.51      9.19       9.87       7.75       0.0        4.78    22233.83     65.27      70.05


  POWER            CO                 CO                THC               NO                 NO                NO
 PERCENT                                2                                                       2                 X
  RATED       LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR       LB/1K#TH-HR        LB/1K#TH-HR       LB/1K#TH-HR
  T.O.

   65            1.025            1717.065             0.0               3.927              0.351             4.277
   82            0.671            1741.975             0.0               4.925              0.389             5.314
   94            0.526            1810.865             0.0               6.228              0.308             6.536
    5           31.423            2992.497             6.519             0.572              1.526             2.098
   86            0.617            1773.210             0.0               5.197              0.380             5.577
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    CAL ID NUMBER:  278   ENGINE TYPE AND MODEL: JT8D-9                   SERIAL NUMBER:  P665165B2

TEST ORGANIZATION:  S W R I TWA

   MODE     FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN       CO        FUEL      LB CO /    ENERGY     LB CO /
              POWER        # TH       RATE       RATE      WT FACTOR    MODE        MASS       MASS    1K LB FUEL  # TH-HR    # TH-HR
                                     LB/HR      LB/HR                   MIN.        LBS.       LBS.

TAXI-IDLE    0.060        870.0    24.526     731.452      1.000       19.00      7.767      231.63     33.531    275.50     0.02819
TAKEOFF      1.000      14500.0     7.431    8359.258      1.000        0.70      0.087       97.52      0.889    169.17     0.00051
CLIMBOUT     0.850      12325.0     7.323    6990.484      1.000        2.20      0.269      256.32      1.048    451.92     0.00059
APPROACH     0.400       5800.0    15.486    2916.116      1.000        4.00      1.032      194.41      5.310    386.67     0.00267
TAXI-IDLE    0.060        870.0    24.526     731.452      1.000        7.00      2.861       85.34     33.531    101.50     0.02819

                                 TOTAL FOR CYCLE:                                12.016      865.21               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:                 13.888
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:                 8.677
                                 LBS POLLUTANT/1000K LB TH AT T.O.:               0.598


   MODE     FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN       HC        FUEL      LB HC /    ENERGY     LB HC /
              POWER        # TH       RATE       RATE      WT FACTOR    MODE        MASS       MASS    1K LB FUEL  # TH-HR    # TH-HR
                                     LB/HR      LB/HR                   MIN.        LBS.       LBS.

TAXI-IDLE    0.060        870.0     5.173     731.452      1.000       19.00      1.638      231.63      7.073    275.50     0.00595
TAKEOFF      1.000      14500.0     0.0      8359.258      1.000        0.70      0.0         97.52      0.0      169.17     0.0
CLIMBOUT     0.850      12325.0     0.115    6990.484      1.000        2.20      0.004      256.32      0.016    451.92     0.00001
APPROACH     0.400       5800.0     0.107    2916.116      1.000        4.00      0.007      194.41      0.037    386.67     0.00002
TAXI-IDLE    0.060        870.0     5.173     731.452      1.000        7.00      0.604       85.34      7.073    101.50     0.00595

                                 TOTAL FOR CYCLE:                                 2.253      865.21               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:                  2.604
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:                 1.627
                                 LBS POLLUTANT/1000K LB TH AT T.O.:               0.0


   MODE     FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN      NOX        FUEL      LB NOX/    ENERGY     LB NOX/
              POWER        # TH       RATE       RATE      WT FACTOR    MODE        MASS       MASS    1K LB FUEL  # TH-HR    # TH-HR
                                     LB/HR      LB/HR                   MIN.        LBS.       LBS.

TAXI-IDLE    0.060        870.0     1.346     731.452      1.000       19.00      0.426      231.63      1.840    275.50     0.00155
TAKEOFF      1.000      14500.0    98.581    8359.258      1.000        0.70      1.150       97.52     11.793    169.17     0.00680
CLIMBOUT     0.850      12325.0    71.154    6990.484      1.000        2.20      2.609      256.32     10.179    451.92     0.00577
APPROACH     0.400       5800.0    14.584    2916.116      1.000        4.00      0.972      194.41      5.001    386.67     0.00251
TAXI-IDLE    0.060        870.0     1.346     731.452      1.000        7.00      0.157       85.34      1.840    101.50     0.00155

                                 TOTAL FOR CYCLE:                                 5.314      865.21               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:                  6.142
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:                 3.838
                                 LBS POLLUTANT/1000K LB TH AT T.O.:              79.318
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DATE:   7/22/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  279   ENGINE TYPE AND MODEL:  JT8D-9                  SERIAL NUMBER:   P665489B

                         RATED THRUST:        14500.

     ENGINE TOTAL TIME:                                4413. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  1027. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      4413. HRS
          N2 COMPRESSOR OVERHAUL:                      4413. HRS
          COMBUSTOR CAN REPLACEMENT:                   1027. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      1027. HRS
          N1 TURBINE OVERHAUL:                         4413. HRS
          N2 TURBINE OVERHAUL:                         4413. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA ********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   71.00   FINISH   71.00

     ATMOSPHERIC PRESSURE:              START   28.82   FINISH   28.83

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0141

     RELATIVE HUMIDITY:                     78.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

 F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
 DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.


 ELAPSED    TEST          POWER                ENGINE           MEASURED   GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
  TIME      MODE    THRUST,LBS  PERCENT         SPEED             FUEL     AIR FLOW      F/A     DISCHARGE    PRESSURE      INLET
                        OR       RATED           RPM              FLOW     LB/SEC                  TEMP        RATIO        TEMP
                       SHP       T.O.      N1          N2        LB/HR                          DEGREES F       EPR      DEGREES F

    0.0     1/ 0    9500.00       65    7170.00  10840.00     5180.00    112.80   0.012800       -0.00       -0.00        -0.00
   13.55    2/ 1   11900.00       82    7700.00  11260.00     6570.00    128.00   0.014200       -0.00       -0.00        -0.00
   28.40    3/ 2   13660.00       94    8150.00  11570.00     7810.00    142.30   0.015200       -0.00       -0.00        -0.00
   33.40    4/ 3    1180.00        8    3100.00   7530.00     1050.00     31.70   0.009200       -0.00       -0.00        -0.00
   39.40    5/ 4   12660.00       87    7470.00  11370.00     7100.00    135.10   0.014600       -0.00       -0.00        -0.00


 POWER     EXHAUST      EXHAUST         CO         CO        THC       NO        NO        NO      ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS          GAS          (WET)         2       (WET)    (WET)        2         X
 RATED      TEMP       PRESSURE        PPMV      (WET)       PPMV     PPMV      (WET)     (WET)
 T.O.    DEGREES F       PSIA                  PERCENT V                         PPMV      PPMV

   65      869.00        9.20         28.00      2.61       0.0      48.00      5.00     53.00     -0.00      -0.00      -0.00
   82      947.00       12.10         16.00      2.87       0.0      68.00      4.00     72.00     -0.00      -0.00      -0.00
   94      974.00       14.50         12.00      3.07       0.0      88.00      5.00     93.00     -0.00      -0.00      -0.00
    8      673.00        0.90        417.00      1.83     144.00      3.00      8.00     11.00     -0.00      -0.00      -0.00
   87      976.00       13.10         16.00      2.97       0.0      75.00      4.00     79.00     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   65        2.14      0.0        0.63   3129.88      6.02      6.64     11.07      0.0       3.25  16212.79     31.17     34.42
   82        1.11      0.0        0.46   3131.47      7.76      8.21      7.30      0.0       3.00  20573.92     50.96     53.96
   94        0.78      0.0        0.53   3132.02      9.39      9.92      6.09      0.0       4.16  24461.05     73.30     77.46
    8       44.09      8.72       1.39   3040.05      0.52      1.91     46.29      9.16      1.46   3192.05      0.55      2.01
   87        1.07      0.0        0.44   3131.55      8.27      8.71      7.62      0.0       3.13  22234.03     58.70     61.83


 POWER          CO                CO              THC               NO               NO               NO
PERCENT                            2                                                  2                X
 RATED      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR
 T.O.

   65          1.165          1706.609           0.0              3.281            0.342            3.623
   82          0.613          1728.901           0.0              4.282            0.252            4.534
   94          0.445          1790.706           0.0              5.366            0.305            5.671
    8         39.231          2705.126           7.759            0.464            1.236            1.700
   87          0.602          1756.243           0.0              4.636            0.247            4.884
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    CAL ID NUMBER:  279   ENGINE TYPE AND MODEL: JT8D-9                    SERIAL NUMBER:  P665489B

TEST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     CO       FUEL      LB CO /     ENERGY    LB CO /
            POWER       # TH       RATE      RATE     WT FACTOR    MODE      MASS      MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR     LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.060       870.0    45.201    748.448     1.000      19.00    14.314    237.01     60.393     275.50     0.05195
TAKEOFF     1.000     14500.0     6.531   8296.590     1.000       0.70     0.076     96.79      0.787     169.17     0.00045
CLIMBOUT    0.850     12325.0     7.897   6848.914     1.000       2.20     0.290    251.13      1.153     451.92     0.00064
APPROACH    0.400      5800.0    20.753   3470.408     1.000       4.00     1.384    231.36      5.980     386.67     0.00358
TAXI-IDLE   0.060       870.0    45.201    748.448     1.000       7.00     5.273     87.32     60.393     101.50     0.05195

                                 TOTAL FOR CYCLE:                          21.336    903.61               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           23.612
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          15.408
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         0.525


  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     HC       FUEL      LB HC /     ENERGY    LB HC /
            POWER       # TH       RATE      RATE     WT FACTOR    MODE      MASS      MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR     LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.060       870.0    10.131    748.448     1.000      19.00     3.208    237.01     13.536     275.50     0.01164
TAKEOFF     1.000     14500.0     0.332   8296.590     1.000       0.70     0.004     96.79      0.040     169.17     0.00002
CLIMBOUT    0.850     12325.0     0.274   6848.914     1.000       2.20     0.010    251.13      0.040     451.92     0.00002
APPROACH    0.400      5800.0     0.270   3470.408     1.000       4.00     0.018    231.36      0.078     386.67     0.00005
TAXI-IDLE   0.060       870.0    10.131    748.448     1.000       7.00     1.182     87.32     13.536     101.50     0.01164

                                 TOTAL FOR CYCLE:                           4.422    903.61               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            4.894
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           3.193
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         0.267


  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN    NOX       FUEL      LB NOX/     ENERGY    LB NOX/
            POWER       # TH       RATE      RATE     WT FACTOR    MODE      MASS      MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR     LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.060       870.0     1.004    748.448     1.000      19.00     0.318    237.01      1.341     275.50     0.00115
TAKEOFF     1.000     14500.0    86.323   8296.590     1.000       0.70     1.007     96.79     10.405     169.17     0.00595
CLIMBOUT    0.850     12325.0    60.330   6848.914     1.000       2.20     2.212    251.13      8.809     451.92     0.00489
APPROACH    0.400      5800.0    13.859   3470.408     1.000       4.00     0.924    231.36      3.993     386.67     0.00239
TAXI-IDLE   0.060       870.0     1.004    748.448     1.000       7.00     0.117     87.32      1.341     101.50     0.00115

                                 TOTAL FOR CYCLE:                           4.578    903.61               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            5.066
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           3.306
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        69.456
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DATE:   7/23/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINF DATA ********************************************************************************************************

     CAL ID NUMBER:  280    ENGINE TYPE AND MODEL:  JT8D-9                    SERIAL NUMBER:   P6651708

                            RATED THRUST:         14500.

     FNGINE TOTAL TIME:                                8088. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      8088. HRS
          N2 COMPRESSOR OVERHAUL:                      8088. HRS
          COMBUSTOR CAN REPLACEMENT:                      0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
          N1 TURBINE OVERHAUL:                         8088. HRS
          N2 TURBINE OVERHAUL:                         8088. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA ********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   82.00   FINISH   82.00

     ATMOSPHERIC PRESSURE:              START   28.81   FINISH   28.81

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0161

     RELATIVE HUMIDITY:                      57.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

 F/A AND AIRFLOW CALCULATED FROM EXHAUST COMPOSITION FOR FOURTH RUN.  NO2
 DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.


 ELAPSED   TEST          POWER                  ENGINE              MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE      TURBINE
  TIME     MODE    THRUST,LBS  PERCENT          SPEED                FUEL     AIR FLOW     F/A     DISCHARGE    PRESSURE     INLET
                       OR       RATED            RPM                 FLOW      LB/SEC                 TEMP        RATIO       TEMP
                      SHP       T.O.       N1          N2            LB/HR                         DEGREES F      EPR      DEGREES F

   0.0     1/ 0    9540.00       65    7230.00   10970.00         5490.00     111.10    0.013700      -0.00        1.65        -0.00
  11.40    2/ 1   11740.00       80    7720.00   11380.00         6820.00     126.10    0.015000      -0.00        1.84        -0.00
  16.25    3/ 2   13760.00       94    8230.00   11760.00         8300.00     140.40    0.016400      -0.00        2.03        -0.00
  22.50    4/ 3     670.00        4    2440.00    6490.00          910.00      29.70    0.008500      -0.00       -0.00        -0.00
  27.00    5/ 4   13550.00       93    8220.00   11710.00         8250.00     138.90    0.016500      -0.00       -0.00        -0.00


 POWER    EXHAUST      EXHAUST          CO          CO        THC       NO         NO         NO      ALDEHYDES    SMOKE   PARTICULATES
PERCENT     GAS          GAS          (WET)          2        (WET)    (WET)        2          X
 RATED     TEMP       PRESSURE         PPMV        (WET)      PPMV     PPMV       (WET)      (WET)
 T.O.    DEGREES F      PSIA                     PERCENT V                        PPMV       PPMV

  65      864.00         9.10         16.00        2.76       1.00     62.00       3.00      65.00      -0.00       -0.00       -0.00
  80      943.00        11.90         14.00        3.02       0.0      80.00       5.00      85.00      -0.00       -0.00       -0.00
  94     1019.00        14.50         10.00        3.21       0.0     111.00       5.00     116.00      -0.00       -0.00       -0.00
   4      705.00         0.40        324.00        1.69     144.00      3.00       9.00      12.00      -0.00       -0.00       -0.00
  93     1005.00        14.40          9.00        3.25       0.0     108.00       3.00     111.00      -0.00       -0.00       -0.00


 POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
 RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
 T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

  65        1.16       0.04       0.36    3131.31       7.35       7.71       6.34       0.23       1.95   17190.91      40.37      42.32
  80        0.92       0.0        0.54    3131.79       8.67       9.21       6.30       0.0        3.70   21358.80      59.15      62.85
  94        0.62       0.0        0.51    3132.26      11.32      11.83       5.15       0.0        4.23   25997.79      93.98      98.21
   4       37.20       9.47       1.70    3048.81       0.57       2.26      33.85       8.62       1.54    2774.42       0.51       2.06
  93        0.55       0.0        0.30    3132.37      10.88      11.18       4.55       0.0        2.49   25842.08      89.77      92.27


 POWER          CO                CO2               THC                NO                 NO                 NO
PERCENT                            2                                                       2                  X
 RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
 T.O.

  65           0.665          1801.982            0.024              4.232              0.205              4.436
  80           0.537          1829.318            0.0                5.038              0.315              5.353
  94           0.375          1889.375            0.0                6.830              0.308              7.138
   4          50.526          4140.922           12.861              0.768              2.305              3.074
  93           0.336          1907.165            0.0                6.625              0.184              6.809
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     CAL ID NUMBER:  280   ENGINE TYPE AND MODEL: JT8D-9                       SERIAL NUMBER:  P6651708
TEST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     CO        FUEL     LB CO /      ENERGY   LB CO /
             POWER      # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL   # TH-HR  # TH-HR
                                  LB/HR     LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060       870.0    28.619    899.137     1.000      19.00     9.063     284.73     31.829     275.50    0.03289
TAKEOFF     1.000     14500.0     5.517   8912.793     1.000       0.70     0.064     103.98      0.619     169.17    0.00038
CLIMBOUT    0.850     12325.0     5.858   7136.168     1.000       2.20     0.215     261.66      0.821     451.92    0.00048
APPROACH    0.400      5800.0    11.291   3933.170     1.000       4.00     0.753     262.21      2.871     386.67    0.00195
TAXI-IDLE   0.060       870.0    28.619    899.137     1.000       7.00     3.339     104.90     31.829     101.50    0.03289

                                 TOTAL FOR CYCLE:                          13.433    1017.48               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           13.202
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           9.701
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         0.444


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     HC        FUEL     LB HC /      ENERGY   LB HC /
             POWER      # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL   # TH-HR  # TH-HR
                                  LB/HR     LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060       870.0     6.070    899.137     1.000      19.00     1.922     284.73      6.751     275.50    0.00698
TAKEOFF     1.000     14500.0     0.881   8912.793     1.000       0.70     0.010     103.98      0.099     169.17    0.00006
CLIMBOUT    0.850     12325.0     0.289   7136.168     1.000       2.20     0.011     261.66      0.041     451.92    0.00002
APPROACH    0.400      5800.0     1.041   3933.170     1.000       4.00     0.069     262.21      0.265     386.67    0.00018
TAXI-IDLE   0.060       870.0     6.070    899.137     1.000       7.00     0.708     104.90      6.751     101.50    0.00698

                                 TOTAL FOR CYCLE:                           2.721    1017.48               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            2.674
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           1.965
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         0.708


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     NOX       FUEL     LB NOX/      ENERGY   LB NOX/
             POWER      # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL   # TH-HR  # TH-HR
                                  LB/HR     LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060       870.0     2.137    899.137     1.000      19.00     0.677     284.73      2.377     275.50    0.00246
TAKEOFF     1.000     14500.0   114.861   8912.793     1.000       0.70     1.340     103.98     12.887     169.17    0.00792
CLIMBOUT    0.850     12325.0    71.512   7136.168     1.000       2.20     2.622     261.66     10.021     451.92    0.00580
APPROACH    0.400      5800.0    21.008   3933.170     1.000       4.00     1.401     262.21      5.341     386.67    0.00362
TAXI-IDLE   0.060       870.0     2.137    899.137     1.000       7.00     0.249     104.90      2.377     101.50    0.00246

                                 TOTAL FOR CYCLE:                           6.289    1017.48               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            6.181
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           4.542
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        92.416
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DATE:   7/27/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER.  283    ENGINE TYPE AND MODEL:  JT8D-9                        SERIAL NUMBER:   P6489158

                            RATED THRUST:        14500.

     ENGINE TOTAL TIME:                            15252. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                  15252. HRS
          N2 COMPRESSOR OVERHAUL:                  15252. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
          N1 TURBINE OVERHAUL:                     15252. HRS
          N2 TURBINE OVERHAUL:                     15252. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA ******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   74.00   FINISH   72.00

     ATMOSPHERIC PRESSURE:              START   28.83   FINISH   28.83

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0107

     RELATIVE HUMIDITY:                      62.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

 NO2 DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.


ELAPSED    TEST          POWER                  ENGINE             MEASURED   GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
 TIME      MODE     THRUST,LBS  PERCENT          SPEED               FUEL     AIR FLOW      F/A      DISCHARGE    PRESSURE      INLET
                        OR       RATED            RPM                FLOW      LB/SEC                  TEMP        RATIO        TEMP
                       SHP       T.O.        N1          N2          LB/HR                           DEGREES F      EPR       DEGREES F

   0.0     1/ 0     9680.00       66     7280.00  10960.00         5600.00    117.50     0.013200     -0.00         1.65         -0.00
   7.20    2/ 1    11370.00       78     7690.00  11270.00         6630.00    129.30     0.014200     -0.00         1.79         -0.00
  12.30    3/ 2    12850.00       88     8050.00  11510.00         7630.00    140.70     0.015100     -0.00         1.92         -0.00
  14.30    4/ 3     1040.00        7     2930.00   7150.00         1010.00     34.20     0.008200     -0.00        -0.00         -0.00
  21.00    5/ 4    12770.00       88     8020.00  11420.00         7600.00    140.20     0.015100     -0.00        -0.00         -0.00


 POWER    EXHAUST       EXHAUST          CO          CO          THC      NO          NO          NO       ALDEHYDES    SMOKE   PARTICULATES
PERCENT     GAS           GAS           (WET)          2        (WET)    (WET)          2          X
 RATED     TEMP         PRESSURE        PPMV        (WET)       PPMV     PPMV       (WET)       (WET)
 T.O.    DEGREES F        PSIA                    PERCENT V                          PPMV        PPMV

  66       887.00         9.20          15.00        2.59       1.00     63.00       2.00        65.00     -0.00       -0.00        -0.00
  78       937.00        11.20          11.00        2.78       0.0      85.00       2.00        87.00     -0.00       -0.00        -0.00
  88       986.00        13.00          10.00        2.93       0.0     101.00       2.00       103.00     -0.00       -0.00        -0.00
   7       678.00         0.70         211.00        1.65      42.00     12.00       3.00        15.00     -0.00       -0.00        -0.00
  88       984.00        12.90          10.00        2.95       0.0      99.00       3.00       102.00     -0.00       -0.00        -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2        NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  66        1.15      0.04      0.25   3131.31      7.96      8.22      6.46      0.25      1.42  17535.32     44.59     46.01
  78        0.79      0.0       0.24   3132.00     10.01     10.25      5.23      0.0       1.56  20765.17     66.37     67.93
  88        0.68      0.0       0.22   3132.17     11.29     11.51      5.19      0.0       1.71  23898.46     86.12     87.83
   7       25.12      2.86      0.59   3085.93      2.35      2.93     25.37      2.89      0.59   3116.78      2.37      2.96
  88        0.68      0.0       0.33   3132.18     10.99     11.32      5.14      0.0       2.53  23804.55     83.51     86.04


 POWER         CO                 CO                 THC                 NO                  NO                 NO
PERCENT                             2                                                          2                  X
 RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR         LB/1K#TH-HR        LB/1K#TH-HR
 T.O.

  66           0.668           1811.500              0.025               4.606               0.146              4.753
  78           0.460           1826.312              0.0                 5.838               0.137              5.975
  88           0.404           1859.802              0.0                 6.702               0.133              6.835
   7          24.391           2996.909              2.781               2.279               0.570              2.848
  88           0.402           1864.100              0.0                 6.540               0.198              6.738
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    CAL ID NUMBER:  283   ENGINE TYPE AND MODEL: JT8D-9               SERIAL NUMBER:  15252.

TEST ORGANIZATION:  S W R I TWA


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL     LB CO /      ENERGY    LB CO /
              POWER      # TH       RATE       RATE     WT FACTOR     MODE      MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE    0.060       870.0    25.947    803.260      1.000       19.00     8.217      254.37      32.303     275.50     0.02982
TAKEOFF      1.000     14500.0     4.943   8405.980      1.000        0.70     0.058       98.07       0.588     169.17     0.00034
CLIMBOUT     0.850     12325.0     4.665   7264.555      1.000        2.20     0.171      266.37       0.642     451.92     0.00038
APPROACH     0.400      5800.0    11.143   3231.328      1.000        4.00     0.743      215.42       3.448     386.67     0.00192
TAXI-IDLE    0.060       870.0    25.947    803.260      1.000        7.00     3.027       93.71      32.303     101.50     0.02982

                                  TOTAL FOR CYCLE:                            12.215      927.94                 1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:             13.164
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:             8.821
                                  LBS POLLUTANT/1000K LB TH AT T.O.:           0.398


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL     LB HC /      ENERGY    LB HC /
              POWER      # TH       RATE       RATE     WT FACTOR     MODE      MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE    0.060       870.0     2.648    803.260      1.000       19.00     0.839      254.37       3.296     275.50     0.00304
TAKEOFF      1.000     14500.0     0.170   8405.980      1.000        0.70     0.002       98.07       0.020     169.17     0.00001
CLIMBOUT     0.850     12325.0     0.073   7264.555      1.000        2.20     0.003      266.37       0.010     451.92     0.00001
APPROACH     0.400      5800.0     1.208   3231.328      1.000        4.00     0.081      215.42       0.374     386.67     0.00021
TAXI-IDLE    0.060       870.0     2.648    803.260      1.000        7.00     0.309       93.71       3.296     101.50     0.00304

                                  TOTAL FOR CYCLE:                             1.233      927.94                 1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:              1.328
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:             0.890
                                  LBS POLLUTANT/1000K LB TH AT T.O.:           0.137


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      NOX        FUEL     LB NOX/      ENERGY    LB NOX/
              POWER      # TH       RATE       RATE     WT FACTOR     MODE      MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE    0.060       870.0     1.847    803.260      1.000       19.00     0.585      254.37       2.300     275.50     0.00212
TAKEOFF      1.000     14500.0   109.397   8405.980      1.000        0.70     1.276       98.07      13.014     169.17     0.00754
CLIMBOUT     0.850     12325.0    80.286   7264.555      1.000        2.20     2.944      266.37      11.052     451.92     0.00651
APPROACH     0.400      5800.0    16.341   3231.328      1.000        4.00     1.089      215.42       5.057     386.67     0.00282
TAXI-IDLE    0.060       870.0     1.847    803.260      1.000        7.00     0.215       93.71       2.300     101.50     0.00212

                                  TOTAL FOR CYCLE:                             6.110      927.94                 1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:              6.584
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:             4.412
                                  LBS POLLUTANT/1000K LB TH AT T.O.:          88.020
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DATE:   [illegible]

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  284    ENGINE TYPE AND MODEL:  JT8D-9                     SERIAL NUMBER:   P674250B

                            RATED THRUST:        14500.

     ENGINE TOTAL TIME:                               3673. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                     3673. HRS
          N2 COMPRESSOR OVERHAUL:                     3673. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                        3673. HRS
          N2 TURBINE OVERHAUL:                        3673. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA ************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   66.00   FINISH   67.00

     ATMOSPHERIC PRESSURE:              START   28.90   FINISH   28.91

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0130

     RELATIVE HUMIDITY:                    84.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

 NO2 DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.


 ELAPSED    TEST           POWER                 ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE     TURBINE
  TIME      MODE    THRUST,LBS  PERCENT          SPEED               FUEL      AIR FLOW      F/A     DISCHARGE    PRESSURE     INLET
                        OR       RATED            RPM                FLOW      LB/SEC                  TEMP        RATIO       TEMP
                       SHP       T.O.         N1         N2         LB/HR                            DEGREES F      EPR     DEGREES F

   0.0      1/ 0     9520.00      65     7120.00  10890.00       5270.00     117.00    0.012500      -0.00        1.65       -0.00
  18.00     2/ 1    11020.00      75     7520.00  11150.00       6150.00     128.00    0.013300      -0.00        1.79       -0.00
  33.00     3/ 2    13700.00      94     8150.00  11580.00       8040.00     148.00    0.015100      -0.00        2.03       -0.00
  40.00     4/ 3      860.00       5     2600.00   6840.00        850.00      31.20    0.007600      -0.00       -0.00       -0.00
  45.00     5/ 4    12740.00      87     7870.00  11400.00       7320.00     141.00    0.014400      -0.00       -0.00       -0.00


 POWER    EXHAUST      EXHAUST         CO          CO        THC       NO        NO        NO      ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS          GAS          (WET)          2       (WET)     (WET)        2         X
 RATED     TEMP       PRESSURE        PPMV        (WET)       PPMV      PPMV     (WET)      (WET)
 T.O.    DEGREES F      PSIA                    PERCENT V                       PPMV       PPMV

  65      833.00        9.10          13.00        2.48       0.0      58.00     5.00      63.00     -0.00      -0.00      -0.00
  75      880.00       10.90          11.00        2.67       0.0      80.00     6.00      86.00     -0.00      -0.00      -0.00
  94      970.00       14.40           8.00        2.92       0.0     120.00     6.00     126.00     -0.00      -0.00      -0.00
   5      667.00        0.60         331.00        1.57     140.00      3.00     7.00      10.00     -0.00      -0.00      -0.00
  87      945.00       13.00          10.00        2.83       1.00    101.00     4.00     105.00     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K    LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  65        1.04      0.0       0.66   3131.60      7.66      8.32      5.51      0.0       3.48  16503.53     40.35     43.83
  75        0.82      0.0       0.74   3131.95      9.81     10.55      5.05      0.0       4.52  19261.50     60.33     64.86
  94        0.55      0.0       0.67   3132.38     13.46     14.13      4.39      0.0       5.41  25184.36    108.20    113.61
   5       40.82      9.89      1.42   3041.98      0.61      2.03     34.69      8.40      1.21   2585.68      0.52      1.72
  87        0.70      0.04      0.46   3132.02     11.69     12.15      5.16      0.30      3.39  22926.41     85.54     88.92


 POWER          CO                 CO                 THC                NO                 NO                 NO
PERCENT                              2                                                          2                  X
 RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
 T.O.

  65          0.578           1733.564             0.0               4.238              0.365              4.604
  75          0.458           1747.867             0.0               5.475              0.411              5.885
  94          0.321           1838.275             0.0               7.898              0.395              8.292
   5         40.343           3006.609             9.773             0.601              1.401              2.002
  87          0.405           1799.562             0.023             6.714              0.266              6.980
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   CAL ID NUMBER:  284   ENGINE TYPE AND MODEL: JT8D-9                 SERIAL NUMBER:  P674250B

TEST ORGANIZATION:  S W R I TWA


   MODE    FRACTIONAL    POWER    EMISSION     FUEL        USAGE     TIME IN      CO          FUEL     LB CO /     ENERGY    LB CO /
             POWER       # TH       RATE       RATE      WT FACTOR     MODE      MASS         MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                    MIN.      LBS.         LBS.

TAXI-IDLE   0.060        870.0    40.008     886.145     1.000       19.00    12.669        280.61     45.148     275.50     0.04599
TAKEOFF     1.000      14500.0     6.207    8828.016     1.000        0.70     0.072        102.99      0.703     169.17     0.00043
CLIMBOUT    0.850      12325.0     4.366    7070.793     1.000        2.20     0.160        259.26      0.618     451.92     0.00035
APPROACH    0.400       5800.0    14.659    3551.601     1.000        4.00     0.977        236.77      4.128     386.67     0.00253
TAXI-IDLE   0.060        870.0    40.008     886.145     1.000        7.00     4.668        103.38     45.148     101.50     0.04599

                                  TOTAL FOR CYCLE:                            18.547        983.02                1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:             18.867
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:            13.393
                                  LBS POLLUTANT/1000K LB TH AT T.O.:           0.499


   MODE    FRACTIONAL    POWER    EMISSION     FUEL        USAGE     TIME IN      HC          FUEL     LB HC /     ENERGY    LB HC /
             POWER       # TH       RATE       RATE      WT FACTOR     MODE      MASS         MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                    MIN.      LBS.         LBS.

TAXI-IDLE   0.060        870.0     9.451     886.145     1.000       19.00     2.993        280.61     10.665     275.50     0.01086
TAKEOFF     1.000      14500.0     0.168    8828.016     1.000        0.70     0.002        102.99      0.019     169.17     0.00001
CLIMBOUT    0.850      12325.0     0.267    7070.793     1.000        2.20     0.010        259.26      0.038     451.92     0.00002
APPROACH    0.400       5800.0     0.429    3551.601     1.000        4.00     0.029        236.77      0.121     386.67     0.00007
TAXI-IDLE   0.060        870.0     9.451     886.145     1.000        7.00     1.103        103.38     10.665     101.50     0.01086

                                  TOTAL FOR CYCLE:                             4.136        983.02                1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:              4.207
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:             2.987
                                  LBS POLLUTANT/1000K LB TH AT T.O.:           0.135


   MODE    FRACTIONAL    POWER    EMISSION     FUEL        USAGE     TIME IN     NOX          FUEL     LB NOX/     ENERGY    LB NOX/
             POWER       # TH       RATE       RATE      WT FACTOR     MODE      MASS         MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                    MIN.      LBS.         LBS.

TAXI-IDLE   0.060        870.0     1.610     886.145     1.000       19.00     0.510        280.61      1.817     275.50     0.00185
TAKEOFF     1.000      14500.0   133.453    8828.016     1.000        0.70     1.557        102.99     15.117     169.17     0.00920
CLIMBOUT    0.850      12325.0    85.160    7070.793     1.000        2.20     3.123        259.26     12.044     451.92     0.00691
APPROACH    0.400       5800.0    15.307    3551.601     1.000        4.00     1.020        236.77      4.310     386.67     0.00264
TAXI-IDLE   0.060        870.0     1.610     886.145     1.000        7.00     0.188        103.38      1.817     101.50     0.00185

                                  TOTAL FOR CYCLE:                             6.398        983.02                1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:              6.508
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:             4.620
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         107.376
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DATE:   7/28/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:  286    ENGINE TYPE AND MODEL:  JT8D-9                     SERIAL NUMBER:   P674250B

                               RATED THRUST:        14500.

     ENGINE TOTAL TIME:                                 3673. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      3673. HRS
          N2 COMPRESSOR OVERHAUL:                      3673. HRS
          COMBUSTOR CAN REPLACEMENT:                      0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
          N1 TURBINE OVERHAUL:                         3673. HRS
          N2 TURBINE OVERHAUL:                         3673. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA ***********************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   67.00   FINISH   68.00

      ATMOSPHERIC PRESSURE:              START   28.98   FINISH   28.98

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0076

      RELATIVE HUMIDITY:                     54.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

      SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:   4

 COMMENTS:

  NO2 DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.
  COMMENT LISTED ON CAL ID #285 ALSO APPLY.


 ELAPSED   TEST        POWER                ENGINE            MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE      TURBINE
  TIME     MODE   THRUST,LBS  PERCENT        SPEED               FUEL    AIR FLOW     F/A     DISCHARGE    PRESSURE      INLET
                      OR       RATED          RPM                FLOW     LB/SEC                TEMP         RATIO        TEMP
                     SHP       T.O.     N1          N2           LB/HR                        DEGREES F       EPR      DEGREES F

    0.0    1/ 0   10820.00      74    7360.00  11080.00        6010.00    126.30   0.013200     -0.00         1.76       -0.00
    5.00   2/ 1   11990.00      82    7620.00  11280.00        6730.00    135.00   0.013800     -0.00         1.87       -0.00
   10.00   3/ 2   13850.00      95    8100.00  11600.00        8050.00    149.00   0.015000     -0.00         2.04       -0.00
   15.00   4/ 3     870.00       5    2650.00   6800.00         870.00     32.20   0.007500     -0.00        -0.00       -0.00


  POWER    EXHAUST     EXHAUST         CO          CO         THC       NO         NO          NO      ALDEHYDES   SMOKE    PARTICULATES
 PERCENT     GAS         GAS          (WET)         2        (WET)     (WET)        2           X
  RATED     TEMP      PRESSURE        PPMV       (WET)       PPMV      PPMV       (WET)       (WET)
  T.O.    DEGREES F     PSIA                    PERCENT V                        PPMV        PPMV

   74      883.00      10.70          12.00        2.69       1.00     74.00       5.00        79.00     -0.00      -0.00      -0.00
   82      918.00      12.30          10.00        2.83       1.00     93.00       5.00        98.00     -0.00      -0.00      -0.00
   95      981.00      14.70           9.00        3.07       0.0     135.00       6.00       141.00     -0.00      -0.00      -0.00
    5      653.00       0.60         272.00        1.56     138.00      5.00       6.00        11.00     -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   74        0.89      0.04      0.61   3131.73      9.01      9.61      5.34      0.26      3.66  18821.68     54.13     57.79
   82        0.70      0.04      0.58   3132.02     10.76     11.34      4.74      0.27      3.89  21078.52     72.41     76.31
   95        0.58      0.0       0.64   3132.32     14.40     15.04      4.70      0.0       5.15  25215.20    115.92    121.07
    5       33.38      9.84      1.23   3053.00      1.02      2.25     29.47      8.56      1.07   2656.11      0.89      1.96


  POWER          CO                  CO                 THC                  NO                  NO                  NO
 PERCENT                              2                                                           2                   X
  RATED     LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR
  T.O.

   74          0.494             1739.527              0.024               5.003               0.338               5.341
   82          0.395             1758.008              0.023               6.039               0.325               6.364
   95          0.340             1820.592              0.0                 8.369               0.372               8.741
    5         33.879             3053.004              9.844               1.023               1.228               2.250
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     CAL ID NUMBER:  286   ENGINE TYPE AND MODEL: JT8D-9                SERIAL NUMBER:  P674250B

TEST ORGANIZATION:  S W R I TWA


   MODE   FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     CO         FUEL     LB CO /     ENERGY   LB CO /
             POWER      # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060       870.0   33.198    829.335     1.000      19.00    10.513     262.62     40.030     275.50     0.03816
TAKEOFF     1.000     14500.0    3.499   8596.344     1.000       0.70     0.041     100.29      0.407     169.17     0.00024
CLIMBOUT    0.850     12325.0    4.600   7090.523     1.000       2.20     0.169     259.99      0.649     451.92     0.00037
APPROACH    0.400      5800.0   16.010   3627.520     1.000       4.00     1.067     241.83      4.413     386.67     0.00276
TAXI-IDLE   0.060       870.0   33.198    829.335     1.000       7.00     3.873      96.76     40.030     101.50     0.03816

                               TOTAL FOR CYCLE:                           15.663     961.49                1384.75
                               LBS POLLUTANT/1K LB FUEL/CYCLE:            16.290
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:           11.311
                               LBS POLLUTANT/1000K LB TH AT T.O.:          0.282


   MODE   FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     HC         FUEL     LB HC /     ENERGY   LB HC /
           , POWER      # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060       870.0    9.701    829.335     1.000      19.00     3.072     262.62     11.697     275.50     0.01115
TAKEOFF     1.000     14500.0    0.665   8596.344     1.000       0.70     0.008     100.29      0.077     169.17     0.00005
CLIMBOUT    0.850     12325.0    0.723   7090.523     1.000       2.20     0.027     259.99      0.102     451.92     0.00006
APPROACH    0.400      5800.0    1.184   3627.520     1.000       4.00     0.079     241.83      0.326     386.67     0.00020
TAXI-IDLE   0.060       870.0    9.701    829.335     1.000       7.00     1.132      96.76     11.697     101.50     0.01115

                               TOTAL FOR CYCLE:                            4.317     961.49                1384.75
                               LBS POLLUTANT/1K LB FUEL/CYCLE:             4.490
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:            3.117
                               LBS POLLUTANT/1000K LB TH AT T.O.:          0.535


   MODE   FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     NOX        FUEL     LB NOX/     ENERGY   LB NOX/
             POWER      # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060       870.0    1.924    829.335     1.000      19.00     0.609     262.62      2.320     275.50     0.00221
TAKEOFF     1.000     14500.0  139.373   8596.344     1.000       0.70     1.626     100.29     16.213     169.17     0.00961
CLIMBOUT    0.850     12325.0   87.191   7090.523     1.000       2.20     3.197     259.99     12.297     451.92     0.00707
APPROACH    0.400      5800.0   13.813   3627.520     1.000       4.00     0.921     241.83      3.808     386.67     0.00238
TAXI-IDLE   0.060       870.0    1.924    829.335     1.000       7.00     0.224      96.76      2.320     101.50     0.00221

                               TOTAL FOR CYCLE:                            6.578     961.49                1384.75
                               LBS POLLUTANT/1K LB FUEL/CYCLE:             6.841
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:            4.750
                               LBS POLLUTANT/1000K LB TH AT T.O.:        112.139
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DATE:   7/29/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:  287    ENGINE TYPE AND MODEL:  JT8D-9                    SERIAL NUMBER:   P6545898

                         RATED THRUST:        14500.

     ENGINE TOTAL TIME:                            4226. HRS

     TIME SINCE HOT SECTION OVERHAUL:               242. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                  4226. HRS
          N2 COMPRESSOR OVERHAUL:                  4226. HRS
          COMBUSTOR CAN REPLACEMENT:                242. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:   242. HRS
          N1 TURBINE OVERHAUL:                     4226. HRS
          N2 TURBINE OVERHAUL:                     4226. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA ******************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   58.00   FINISH   58.00

      ATMOSPHERIC PRESSURE:              START   29.01   FINISH   29.00

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0110

      RELATIVE HUMIDITY:                     97.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

      SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:   5

 COMMENTS:

  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.  NO2 DETERMINED BY SUBTRACTION.


 ELAPSED    TEST          POWER                  ENGINE               MEASURED   GAS GEN      CALC    COMPRESSOR    ENGINE      TURBINE
  TIME      MODE    THRUST,LBS  PERCENT          SPEED                  FUEL    AIR FLOW      F/A    DISCHARGE    PRESSURE      INLET
                        OR       RATED            RPM                   FLOW     LB/SEC                 TEMP        RATIO        TEMP
                       SHP       T.O.        N1          N2            LB/HR                        DEGREES F      EPR      DEGREES F

   0.0      1/ 0     9500.00      65     7220.00  10700.00           5400.00    118.00   0.012700     -0.00        1.64        -0.00
  15.00     2/ 1    11400.00      78     7550.00  11170.00           6500.00    132.70   0.013700     -0.00       -0.00        -0.00
  28.00     3/ 2    13200.00      91     8000.00  11480.00           7810.00    145.70   0.014900     -0.00       -0.00        -0.00
  33.00     4/ 3     1020.00       7     2850.00   7110.00            980.00     34.50   0.007900     -0.00       -0.00        -0.00
  37.00     5/ 4    13260.00      91     7960.00  11450.00           7840.00    146.20   0.014900     -0.00       -0.00        -0.00


  POWER    EXHAUST     EXHAUST         CO         CO       THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS          (WET)        2      (WET)     (WET)       2         X
  RATED     TEMP      PRESSURE        PPMV      (WET)     PPMV      PPMV     (WET)     (WET)
  T.O.    DEGREES F     PSIA                  PERCENT V                       PPMV      PPMV

   65      846.00       9.10         16.00      2.58      0.0      69.00      6.00     75.00     -0.00      -0.00      -0.00
   78      907.00      11.50         11.00      2.80      0.0      89.00      5.00     94.00     -0.00      -0.00      -0.00
   91      977.00      13.60          9.00      3.00      0.0     121.00      5.00    126.00     -0.00      -0.00      -0.00
    7      558.00       0.60        354.00      1.64    142.00      3.00      9.00     12.00     -0.00      -0.00      -0.00
   91      977.00      13.50          8.00      2.99      0.0     116.00      4.00    120.00     -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   65        1.24      0.0        0.76   3131.30      8.75      9.52      6.67      0.0       4.11   16909.02    47.27     51.39
   78        0.78      0.0        0.58   3132.01     10.41     10.99      5.09      0.0       3.80   20358.06    67.65     71.45
   91        0.60      0.0        0.55   3132.30     13.21     13.75      4.67      0.0       4.26   24463.27   103.15    107.41
    7       41.78      9.60       1.74   3041.26      0.58      2.33     40.95      9.41      1.71    2980.44     0.57      2.28
   91        0.53      0.0        0.44   3132.40     12.70     13.14      4.18      0.0       3.43   24558.04    99.60    103.04


  POWER          CO                CO               THC                NO                NO               NO
 PERCENT                            2                                                     2                X
  RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

   65          0.703          1779.896            0.0              4.976             0.433            5.409
   78          0.447          1785.795            0.0              5.934             0.333            6.267
   91          0.354          1853.278            0.0              7.814             0.323            8.137
    7         40.142          2921.999            9.222            0.559             1.676            2.235
   91          0.315          1852.039            0.0              7.511             0.259            7.770
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    CAL ID NUMBER:  287   ENGINE TYPE AND MODEL: JT8D-9                SERIAL NUMBER:  P6545898

TEST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN      CO          FUEL      LB CO /      ENERGY    LB CO /
            POWER        # TH      RATE       RATE     WT FACTOR     MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.         LBS.

TAXI-IDLE   0.060       870.0    68.738    789.361     1.000        19.00     21.767       249.96     87.081      275.50     0.07901
TAKEOFF     1.000     14500.0     5.330   8708.711     1.000         0.70      0.062       101.60      0.612      169.17     0.00037
CLIMBOUT    0.850     12325.0     4.811   7234.828     1.000         2.20      0.176       265.28      0.665      451.92     0.00039
APPROACH    0.400      5800.0    16.201   3590.599     1.000         4.00      1.080       239.37      4.512      386.67     0.00279
TAXI-IDLE   0.060       870.0    68.738    789.361     1.000         7.00      8.019        92.09     87.081      101.50     0.07901

                                 TOTAL FOR CYCLE:                             31.105       948.31                 1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              32.801
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             22.463
                                 LBS POLLUTANT/1000K LB TH AT T.O.:            0.429


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN      HC          FUEL      LB HC /      ENERGY    LB HC /
            POWER        # TH      RATE       RATE     WT FACTOR     MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.         LBS.

TAXI-IDLE   0.060       870.0    11.397    789.361     1.000        19.00      3.609       249.96     14.438      275.50     0.01310
TAKEOFF     1.000     14500.0     0.172   8708.711     1.000         0.70      0.002       101.60      0.020      169.17     0.00001
CLIMBOUT    0.850     12325.0     0.221   7234.828     1.000         2.20      0.008       265.28      0.031      451.92     0.00002
APPROACH    0.400      5800.0     0.208   3590.599     1.000         4.00      0.014       239.37      0.058      386.67     0.00004
TAXI-IDLE   0.060       870.0    11.397    789.361     1.000         7.00      1.330        92.09     14.438      101.50     0.01310

                                 TOTAL FOR CYCLE:                              4.963       948.31                 1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               5.233
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              3.584
                                 LBS POLLUTANT/1000K LB TH AT T.O.:            0.138


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN     NOX          FUEL      LB NOX/      ENERGY    LB NOX/
            POWER        # TH      RATE       RATE     WT FACTOR     MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.         LBS.

TAXI-IDLE   0.060       870.0     1.393    789.361     1.000        19.00      0.441       249.96      1.764      275.50     0.00160
TAKEOFF     1.000     14500.0   130.491   8708.711     1.000         0.70      1.522       101.60     14.984      169.17     0.00900
CLIMBOUT    0.850     12325.0    90.110   7234.828     1.000         2.20      3.304       265.28     12.455      451.92     0.00731
APPROACH    0.400      5800.0    18.647   3590.599     1.000         4.00      1.243       239.37      5.193      386.67     0.00321
TAXI-IDLE   0.060       870.0     1.393    789.361     1.000         7.00      0.162        92.09      1.764      101.50     0.00160

                                 TOTAL FOR CYCLE:                              6.673       948.31                 1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               7.037
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              4.819
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          104.993
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DATE: 7/29/71

TEST ORGANIZATION: S W R I TWA

ENGINE SUPPLIER: T W A

ENGINE DATA **

CAL ID NUMBER: 288   ENGINE TYPE AND MODEL: JT8D-9   SERIAL NUMBER: P6742668

RATED THRUST: 14500.

ENGINE TOTAL TIME: 4078. HRS

TIME SINCE HOT SECTION OVERHAUL: 2945. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	4078. HRS
N2 COMPRESSOR OVERHAUL:	4078. HRS
COMBUSTOR CAN REPLACEMENT:	2945. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	2945. HRS
N1 TURBINE OVERHAUL:	4078. HRS
N2 TURBINE OVERHAUL:	4078. HRS

FUEL: JP-4 TF   FUEL H/C RATIO: 2.020

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 63.00 FINISH 63.00

ATMOSPHERIC PRESSURE: START 29.02 FINISH 29.02

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0107

RELATIVE HUMIDITY: 86.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 5

COMMENTS:

ENGINE EQUIPPED WITH SMOKELESS BURNER CANS. NO2 DETERMINED BY SUBTRACTION.

ELAPSED TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	1/ 0	9700.00	66	7130.00	10710.00	5470.00	119.00	0.012800	-0.00	1.65	-0.00
10.00	2/ 1	12000.00	82	7640.00	11100.00	6840.00	135.80	0.014000	-0.00	1.86	-0.00
20.00	3/ 2	13840.00	95	8090.00	11420.00	8130.00	149.30	0.015100	-0.00	2.02	-0.00
25.00	4/ 3	880.00	6	2520.00	6950.00	910.00	32.40	0.007800	-0.00	-0.00	-0.00
31.00	5/ 4	13360.00	92	7960.00	11260.00	7770.00	146.50	0.014700	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO 2 (WET) PPMV	NC X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
66	838.00	9.20	12.00	2.59	0.0	65.00	3.00	68.00	-0.00	-0.00	-0.00
82	898.00	12.00	9.00	2.81	0.0	90.00	4.00	94.00	-0.00	-0.00	-0.00
95	961.00	14.50	6.00	2.97	0.0	117.00	5.00	122.00	-0.00	-0.00	-0.00
6	692.00	0.60	285.00	1.62	120.00	6.00	7.00	13.00	-0.00	-0.00	-0.00
92	941.00	13.70	6.00	2.94	0.0	107.00	7.00	114.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
66	0.92	0.0	0.38	3131.79	8.22	8.60	5.05	0.0	2.07	17130.89	44.94	47.02
82	0.64	0.0	0.47	3132.24	10.49	10.95	4.37	0.0	3.19	21424.50	71.73	74.92
95	0.40	0.0	0.55	3132.61	12.90	13.45	3.27	0.0	4.48	25463.10	104.88	109.37
6	34.23	8.25	1.38	3056.82	1.19	2.56	31.15	7.51	1.26	2781.71	1.08	2.33
92	0.41	0.0	0.78	3132.60	11.92	12.70	3.16	0.0	6.06	24340.31	92.61	98.67

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO 2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO 2 LB/1K#TH-HR	NO X LB/1K#TH-HR
66	0.521	1756.071	0.0	4.633	0.214	4.847
82	0.364	1785.375	0.0	5.978	0.266	6.244
95	0.237	1840.191	0.0	7.578	0.324	7.902
6	35.393	3161.030	8.535	1.224	1.428	2.652
92	0.237	1821.880	0.0	6.932	0.453	7.385

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    CAL ID NUMBER:  288   ENGINE TYPE AND MODEL: JT8D-9                  SERIAL NUMBER:  P6742668

TEST ORGANIZATION:  S W R I TWA


  MODE   FRACTIONAL    POWER   EMISSION    FUEL      USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY   LB CO /
            POWER       # TH      RATE      RATE    WT FACTOR     MODE      MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060       87C.0   33.905    817.096     1.000      19.00    10.736     258.75     41.494     275.50    0.03897
TAKEOFF     1.000     14500.0    2.840   8499.000     1.000       0.70     0.033      99.15      0.334     169.17    0.00020
CLIMBOUT    0.850     12325.0    3.938   7098.379     1.000       2.20     0.144     260.27      0.555     451.92    0.00032
APPROACH    0.400      5800.0    9.291   2975.971     1.000       4.00     0.619     198.40      3.122     386.67    0.00160
TAXI-IDLE   0.060       870.0   33.905    817.096     1.000       7.00     3.956      95.33     41.494     101.50    0.03897

                                 TOTAL FOR CYCLE:                         15.489     911.90                1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:          16.985
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:         11.185
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        0.229


  MODE   FRACTIONAL    POWER   EMISSION    FUEL      USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY   LB HC /
            POWER       # TH      RATE      RATE    WT FACTOR     MODE      MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060       870.0    7.559    817.096     1.000      19.00     2.394     258.75      9.251     275.50    0.00869
TAKEOFF     1.000     14500.0    0.170   8499.000     1.000       0.70     0.002      99.15      0.020     169.17    0.00001
CLIMBOUT    0.850     12325.0    0.142   7098.379     1.000       2.20     0.005     260.27      0.020     451.92    0.00001
APPROACH    0.400      5800.0    0.227   2975.971     1.000       4.00     0.015     198.40      0.076     386.67    0.00004
TAXI-IDLE   0.060       870.0    7.559    817.096     1.000       7.00     0.882      95.33      9.251     101.50    0.00869

                                 TOTAL FOR CYCLE:                          3.298     911.90                1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           3.616
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          2.382
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        0.137


  MODE   FRACTIONAL    POWER   EMISSION    FUEL      USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY   LB NOX/
            POWER       # TH      RATE      RATE    WT FACTOR     MODE      MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060       870.0    1.888    817.096     1.000      19.00     0.598     258.75      2.310     275.50    0.00217
TAKEOFF     1.000     14500.0  125.981   8499.000     1.000       0.70     1.470      99.15     14.823     169.17    0.00869
CLIMBOUT    0.850     12325.0   80.093   7098.379     1.000       2.20     2.937     260.27     11.283     451.92    0.00650
APPROACH    0.400      5800.0   17.350   2975.971     1.000       4.00     1.157     198.40      5.830     386.67    0.00299
TAXI-IDLE   0.060       870.0    1.888    817.096     1.000       7.00     0.220      95.33      2.310     101.50    0.00217

                                 TOTAL FOR CYCLE:                          6.381     911.90                1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           6.998
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          4.608
                                 LBS POLLUTANT/1000K LB TH AT T.O.:      101.364
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DATE:   8/ 3/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:  303    ENGINE TYPE AND MODEL:  JT8D-9                    SERIAL NUMBER:   P6743798

                            RATED THRUST:        14500.

     ENGINE TOTAL TIME:                                   3686. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      460. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         3686. HRS
          N2 COMPRESSOR OVERHAUL:                         3686. HRS
          COMBUSTOR CAN REPLACEMENT:                       460. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         3686. HRS
          N1 TURBINE OVERHAUL:                            3686. HRS
          N2 TURBINE OVERHAUL:                            3686. HRS

     FUEL: JP-4 TF                FUEL H/C RATIO:   2.020

OPERATIONAL DATA *******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   78.00   FINISH   78.00

     ATMOSPHERIC PRESSURE:              START   28.97   FINISH   28.67

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0129

     RELATIVE HUMIDITY:                      60.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   4

COMMENTS:

 NO2 DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.
 THIS TEST AND TEST CAL NO. 304 WERE RUN ON THE SAME JT8D-9 ENGINE.  TEST 303
 WAS RUN WITH NO SMOKE ELIMINATOR (ETHYL CI-2) IN THE FUEL AND TEST 304 WAS RUN
 WITH FUEL CONTAINING THE NORMAL CONCENTRATION OF CI-2 (0.1% BY VOLUME)


ELAPSED    TEST          POWER                  ENGINE            MEASURED    GAS GEN     CALC      COMPRESSOR     ENGINE       TURBINE
 TIME      MODE    THRUST,LBS  PERCENT          SPEED               FUEL     AIR FLOW     F/A      DISCHARGE     PRESSURE       INLET
                       OR       RATED            RPM                FLOW      LB/SEC                  TEMP         RATIO         TEMP
                      SHP       T.O.        N1          N2         LB/HR                           DEGREES F       EPR       DEGREES F

   0.0      1/ 0    9640.00       66    7250.00  10880.00       5540.00     116.50   0.013200       -0.00        -0.00          -0.00
   5.00     2/ 1   11820.00       81    7730.00  11210.00       6840.00     132.20   0.014400       -0.00        -0.00          -0.00
  10.00     3/ 2   13780.00       95    8260.00  11570.00       8220.00     147.40   0.015500       -0.00        -0.00          -0.00
  15.00     4/ 3     900.00        6    2710.00   6960.00        880.00      32.30   0.007600       -0.00        -0.00          -0.00


POWER    EXHAUST      EXHAUST          CO          CO         THC       NO         NO         NO      ALDEHYDES   SMOKE   PARTICULATES
PERCENT    GAS          GAS           (WET)         2        (WET)     (WET)        2          X
RATED     TEMP       PRESSURE         PPMV       (WET)       PPMV      PPMV       (WET)      (WET)
T.O.    DEGREES F      PSIA                    PERCENT V                          PPMV       PPMV

  66      880.00        9.00          11.00        2.69      0.0       62.00      5.00      67.00     -0.00      -0.00      -0.00
  81      945.00       11.90          12.00        2.93      0.0       86.00      4.00      90.00     -0.00      -0.00      -0.00
  95     1018.00       14.50          11.00        3.14      0.0      119.00      6.00     125.00     -0.00      -0.00      -0.00
   6      680.00        0.60         318.00        1.60    167.00       5.00      7.00      12.00     -0.00      -0.00      -0.00


POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  66       0.82      0.0       0.61   3131.96      7.55      8.15      4.52      0.0       3.37   17351.05     41.81     45.18
  81       0.82      0.0       0.45   3131.96      9.61     10.06      5.58      0.0       3.06   21472.59     65.73     68.79
  95       0.70      0.0       0.63   3132.14     12.41     13.03      5.74      0.0       5.14   25746.21    102.00    107.15
   6      38.47     11.57      1.39   3041.06      0.99      2.38     33.85     10.18      1.22    2676.13      0.87      2.10


POWER          CO                 CO                THC                NO                 NO                 NO
PERCENT                            2                                                       2                  X
RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
T.O.

  66         0.468            1799.902             0.0                4.337              0.350              4.687
  81         0.472            1812.402             0.0                5.561              0.259              5.820
  95         0.417            1868.375             0.0                7.402              0.373              7.775
   6        37.613            2973.481            11.313              0.971              1.360              2.331
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    CAL ID NUMBER:  303   ENGINE TYPE AND MODEL: JT8D-9                SERIAL NUMBER:  P6743798
TEST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN      CO        FUEL      LB CO /     ENERGY    LB CO /
            POWER       # TH       RATE       RATE     WT FACTOR     MODE       MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060       870.0    33.265     746.939     1.000       19.00     10.534     236.53     44.535     275.50    0.03824
TAKEOFF     1.000     14500.0     6.794    8704.867     1.000        0.70      0.079     101.56      0.780     169.17    0.00047
CLIMBOUT    0.850     12325.0     5.361    7259.121     1.000        2.20      0.197     266.17      0.739     451.92    0.00043
APPROACH    0.400      5800.0    10.568    3423.015     1.000        4.00      0.705     228.20      3.087     386.67    0.00182
TAXI-IDLE   0.060       870.0    33.265     746.939     1.000        7.00      3.881      87.14     44.535     101.50    0.03824

                                 TOTAL FOR CYCLE:                            15.395     919.60               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             16.741
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            11.118
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           0.547


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN      HC        FUEL      LB HC /     ENERGY    LB HC /
            POWER       # TH       RATE       RATE     WT FACTOR     MODE       MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060       870.0    10.019     746.939     1.000       19.00      3.173     236.53     13.414     275.50    0.01152
TAKEOFF     1.000     14500.0    0.0       8704.867     1.000        0.70      0.0       101.56      0.0       169.17    0.0
CLIMBOUT    0.850     12325.0    0.218     7259.121     1.000        2.20      0.008     266.17      0.030     451.92    0.00002
APPROACH    0.400      5800.0    0.609     3423.015     1.000        4.00      0.041     228.20      0.178     386.67    0.00011
TAXI-IDLE   0.060       870.0   10.019      746.939     1.000        7.00      1.169      87.14     13.414     101.50    0.01152

                                 TOTAL FOR CYCLE:                             4.390     919.60               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              4.774
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             3.170
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           0.0


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN     NOX        FUEL      LB NOX/     ENERGY    LB NOX/
            POWER       # TH       RATE       RATE     WT FACTOR     MODE       MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060       870.0     1.192     746.939     1.000       19.00      0.377     236.53      1.596     275.50    0.00137
TAKEOFF     1.000     14500.0   126.443    8704.867     1.000        0.70      1.475     101.56     14.526     169.17    0.00872
CLIMBOUT    0.850     12325.0    79.471    7259.121     1.000        2.20      2.914     266.17     10.948     451.92    0.00645
APPROACH    0.400      5800.0    18.366    3423.015     1.000        4.00      1.224     228.20      5.365     386.67    0.00317
TAXI-IDLE   0.060       870.0     1.192     746.939     1.000        7.00      0.139      87.14      1.596     101.50    0.00137

                                 TOTAL FOR CYCLE:                             6.130     919.60               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              6.666
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             4.427
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         101.735
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DATE:   8/ 3/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINF DATA ***********************************************************************************************************

     CAL ID NUMBER:  304    ENGINE TYPE AND MODEL:  JT8D-9                        SERIAL NUMBER:   P674379D

                            RATED THRUST:         14500.

     ENGINE TOTAL TIME:                                    3686. HRS

     TIME SINCE HOT SECTION OVERHAUL:                       460. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          3686. HRS
          N2 COMPRESSOR OVERHAUL:                          3686. HRS
          COMBUSTOR CAN REPLACEMENT:                        460. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          3686. HRS
          N1 TURBINF OVERHAUL:                             3686. HRS
          N2 TURBINE OVERHAUL:                             3686. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA *****************************************************

     INLFT AIR TEMPERATURE, DEGREES F:  START   80.00   FINISH   80.00

     ATMOSPHFRIC PRESSURE:              START   28.97   FINISH   28.97

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0129

     RELATIVE HUMIDITY:                      54.00  PFRCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.0C,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIMF, SFC:     1.00

NUMBER OF TESTS:   4

COMMENTS:

 NO2 DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.
 FUEL CONTAINS THF 'NORMAL' CONCENTRATION OF CI-2 SMOKE SUPPRESSANT (0.1% BY
 VOLUME).  THIS IS THF SAME ENGINE TESTED DURING TEST CAL NO. 303.


 ELAPSED    TEST          POWER                ENGINE           MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE      TURBINE
  TIME      MODE    THRUST,LBS  PERCENT         SPEED              FUEL    AIR FLOW     F/A     DISCHARGE    PRESSURE      INLET
                        OR       RATED           RPM               FLOW    LB/SEC                  TEMP        RATIO        TEMP
                       SHP       T.O.      N1          N2         LB/HR                        DEGREES F       EPR      DEGREES F

    0.0     1/ 0     9700.00       66    7250.00   10890.00      5480.00    116.70   0.013000      -0.00       -0.00        -0.00
    3.30    2/ 1    11900.00       82    7790.00   11260.00      6910.00    132.90   0.014400      -0.00       -0.00        -0.00
    8.00    3/ 2    13740.00       94    8260.00   11590.00      5300.00    146.60   0.015700      -0.00       -0.00        -0.00
   13.00    4/ 3      900.00        6    2720.00    6950.00       890.00     32.30   0.007600      -0.00       -0.00        -0.00


 POWER     EXHAUST      EXHAUST        CO         CO        THC       NO        NO        NO      ALDEHYDES   SMOKE   PARTICULATES
PERCENT      GAS          GAS        (WET)         2       (WET)    (WET)        2         X
 RATED      TEMP        PRESSURE      PPMV      (WET)       PPMV     PPMV     (WET)     (WET)
 T.O.    DEGREES F       PSIA                 PERCENT V                        PPMV      PPMV

  66       878.00        9.00        26.00       2.66       0.0     61.00      5.00     66.00     -0.00      -0.00      -0.00
  82       950.00       11.90        19.00       2.98       0.0     89.00      2.00     91.00     -0.00      -0.00      -0.00
  94      1031.00       14.30        15.00       3.20       0.0    119.00      4.00    123.00     -0.00      -0.00      -0.00
   6       685.00        0.60       345.00       1.59     194.00     5.00      7.00    129.00     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  66        1.95      0.0       0.62    3130.18      7.50      8.12     10.67      0.0       3.37   17153.39    41.12     44.49
  82        1.27      0.0       0.22    3131.24      9.78     10.00      8.78      0.0       1.52   21636.89    67.55     69.07
  94        0.93      0.0       0.41    3131.77     12.18     12.58      4.95      0.0       2.17   16598.39    64.53     66.70
   6       41.85     13.48      1.39    3030.51      1.00     25.70     37.25     12.00      1.24    2697.15     0.89     22.86


 POWER          CO                 CO                THC                NO                 NO                 NO
PERCENT                             2                                                        2                  X
 RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
 T.O.

  66          1.100            1768.391             0.0               4.239              0.347              4.587
  82          0.738            1818.226             0.0               5.677              0.128              5.804
  94          0.360            1208.034             0.0               4.696              0.158              4.854
   6         41.385            2996.838            13.328             0.985              1.379             25.418
   CAL ID NUMBER:  304   ENGINE TYPE AND MODEL: JT8D-9                SERIAL NUMBER:  P6743798

TEST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     CO        FUEL    LB CO /    ENERGY    LB CO /
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060      870.0   32.009    781.719     1.000       19.00    10.136      247.54    40.947    275.50    0.03679
TAKEOFF     1.000    14500.0    9.190   8561.344     1.000        0.70     0.107       99.88     1.073    169.17    0.00063
CLIMBOUT    0.850    12325.0   10.375   7169.719     1.000        2.20     0.380      262.89     1.447    451.92    0.00084
APPROACH    0.400     5800.0   15.135   3286.938     1.000        4.00     1.009      219.13     4.605    386.67    0.00261
TAXI-IDLE   0.060      870.0   32.009    781.719     1.000        7.00     3.734       91.20    40.947    101.50    0.03679

                               TOTAL FOR CYCLE:                           15.367      920.65              1384.75
                               LBS POLLUTANT/1K LB FUEL/CYCLE:            16.692
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:           11.098
                               LBS POLLUTANT/1000K LB TH AT T.O.:          0.739


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     HC        FUEL    LB HC /    ENERGY    LB HC /
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060      870.0   11.374    781.719     1.000       19.00     3.602      247.54    14.550    275.50    0.01307
TAKEOFF     1.000    14500.0    0.0     8561.344     1.000        0.70     0.0         99.88     0.0      169.17    0.0
CLIMBOUT    0.850    12325.0    0.0     7169.719     1.000        2.20     0.0        262.89     0.0      451.92    0.0
APPROACH    0.400     5800.0    1.014   3286.938     1.000        4.00     0.068      219.13     0.309    386.67    0.00017
TAXI-IDLE   0.060      870.0   11.374    781.719     1.000        7.00     1.327       91.20    14.550    101.50    0.01307

                               TOTAL FOR CYCLE:                            4.996      920.65              1384.75
                               LBS POLLUTANT/1K LB FUEL/CYCLE:             5.427
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:            3.608
                               LBS POLLUTANT/1000K LB TH AT T.O.:          0.0


  MODE    FRACTIONAL    POWER   EMISSION    FUEL       USAGE     TIME IN     NOX       FUEL    LB NOX/    ENERGY    LB NOX/
            POWER       # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060      870.0    3.594    781.719     1.000       19.00     1.138      247.54     4.598    275.50    0.00413
TAKEOFF     1.000    14500.0  234.290   8561.344     1.000        0.70     2.733       99.88    27.366    169.17    0.01616
CLIMBOUT    0.850    12325.0  151.259   7169.719     1.000        2.20     5.546      262.89    21.097    451.92    0.01227
APPROACH    0.400     5800.0   35.232   3286.938     1.000        4.00     2.349      219.13    10.719    386.67    0.00607
TAXI-IDLE   0.060      870.0    3.594    781.719     1.000        7.00     0.419       91.20     4.598    101.50    0.00413

                               TOTAL FOR CYCLE:                           12.186      920.65              1384.75
                               LBS POLLUTANT/1K LB FUEL/CYCLE:            13.236
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:            8.800
                               LBS POLLUTANT/1000K LB TH AT T.O.:        188.509
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DATE:   7/13/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A
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ENGINE DATA ****************************************************************************************************
                                                                       SERIAL NUMBER:   P6742998
     CAL ID NUMBER:  305    ENGINE TYPE AND MODEL:  JT8D-9

                            RATED THRUST:          14500.

     ENGINE TOTAL TIME:                             3674. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                   3674. HRS
          N2 COMPRESSOR OVERHAUL:                   3674. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
          N1 TURBINE OVERHAUL:                      3674. HRS
          N2 TURBINE OVERHAUL:                      3674. HRS

     FUEL: JP-4 TF             FUEL H/C RATIO:   2.020
OPERATIONAL DATA ***************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   79.00   FINISH   79.00

     ATMOSPHERIC PRESSURE:              START   28.92   FINISH   28.92

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0152

     RELATIVE HUMIDITY:                  68.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

  NUMBER OF TESTS:   4

  COMMENTS:

  NO2 DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.

                                                                                                              TURBINE
                                                                                   COMPRESSOR     ENGINE       INLET
 ELAPSED    TEST        POWER                    ENGINE         MEASURED   GAS GEN     CALC    DISCHARGE    PRESSURE      TEMP
  TIME      MODE   THRUST,LBS  PERCENT           SPEED           FUEL     AIR FLOW     F/A        TEMP        RATIO     DEGREES F
                       OR       RATED             RPM            FLOW      LB/SEC              DEGREES F       EPR
                      SHP       T.O.        N1         N2        LB/HR

   0.0      1/ 0    9450.00      65      7160.00  10830.00     5470.00    115.10    0.013200     -0.00        1.65        -0.00
   5.00     2/ 1   11320.00      78      7550.00  11160.00     6520.00    128.50    0.014100     -0.00        1.81        -0.00
  11.30     3/ 2   13400.00      92      8060.00  11480.00     7850.00    144.10    0.015300     -0.00        2.02        -0.00
  16.30     4/ 3    1020.00       7      2850.00   7120.00     1190.00     34.10    0.009700     -0.00       -0.00        -0.00

                                                                          NO                 NO     ALDEHYDES    SMOKE    PARTICULATES
 POWER     EXHAUST      EXHAUST          CO        CO         THC       NO        2                  X
PERCENT      GAS          GAS          (WET)        2        (WET)    (WET)     (WET)             (WET)
 RATED       TEMP       PRESSURE        PPMV      (WET)       PPMV     PPMV      PPMV              PPMV
  T.O.    DEGREES F       PSIA                  PERCENT V

   65       895.00        9.10         25.00  [illegible]      1.00    63.00      6.00             69.00     -0.00      -0.00      -0.00
   78       941.00       11.30         20.00  [illegible]      0.0     85.00      4.00             89.00     -0.00      -0.00      -0.00
   92      1009.00       14.10         17.00  [illegible]      0.0    120.00      8.00            128.00     -0.00      -0.00      -0.00
    7       681.00        0.60        305.00  [illegible]     94.00     2.00      8.00             10.00     -0.00      -0.00      -0.00

                                                                                                           MASS EMI   MASS EMI  MASS EMI
 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI   MASS EMI      NO        NOX
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2        CO2       LB/HR     LB/HR
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR      LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   65       1.95      0.04      0.74    3130.05     7.78      8.52     10.69      0.24      4.05    17121.39     42.55     46.60
   78       1.42      0.0       0.47    3131.00     9.94     10.40      9.28      0.0       3.05    20414.14     64.78     67.83
   92       1.11      0.0       0.86    3131.50    12.89     13.74      8.72      0.0       6.74    24582.25    101.11    107.65
    7      32.18      5.68      1.39    3067.09     0.35      1.73     38.30      6.76      1.65     3649.84      0.41      2.06

                                                                            NO               NO
 POWER          CO             CO              THC            NO             2                X
PERCENT                         2                                      LB/1K#TH-HR      LB/1K#TH-HR
 RATED      LB/1K#TH-HR    LB/1K#TH-HR     LB/1K#TH-HR    LB/1K#TH-HR
  T.O.

   65          1.131        1811.787          0.025          4.503          0.429            4.932
   78          0.920        1803.369          0.0            5.723          0.269            5.992
   92          0.651        1834.496          0.0            7.545          0.503            8.048
    7         37.546        3578.274          6.627          0.404          1.618            2.022
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     CAL ID NUMBER:  305   ENGINE TYPE AND MODEL: JT8D-9                SERIAL NUMBER:  P6742998

TEST ORGANIZATION:  S W R I TWA

   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN       CO         FUEL      LB CO /      ENERGY    LB CO /
             POWER       # TH       RATE       RATE     WT FACTOR     MODE        MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                   MIN.        LBS.        LBS.

TAXI-IDLE    0.060       870.0    51.007   1082.793     1.000       19.00     16.152      342.88       47.107     275.50    0.05863
TAKEOFF      1.000     14500.0     8.538   8559.730     1.000        0.70      0.100       99.86        0.997     169.17    0.00059
CLIMBOUT     0.850     12325.0     9.274   7168.734     1.000        2.20      0.340      262.85        1.294     451.92    0.00075
APPROACH     0.400      5800.0    15.276   3523.386     1.000        4.00      1.018      234.89        4.336     386.67    0.00263
TAXI-IDLE    0.060       870.0    51.007   1082.793     1.000        7.00      5.951      126.33       47.107     101.50    0.05863

                                  TOTAL FOR CYCLE:                          23.561     1066.82                 1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:           22.085
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:          17.015
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         0.687

   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN       HC         FUEL      LB HC /      ENERGY    LB HC /
             POWER       # TH       RATE       RATE     WT FACTOR     MODE        MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                   MIN.        LBS.        LBS.

TAXI-IDLE    0.060       870.0     7.703   1082.793     1.000       19.00      2.439      342.88        7.114     275.50    0.00885
TAKEOFF      1.000     14500.0     0.309   8559.730     1.000        0.70      0.004       99.86        0.036     169.17    0.00002
CLIMBOUT     0.850     12325.0     0.359   7168.734     1.000        2.20      0.013      262.85        0.050     451.92    0.00003
APPROACH     0.400      5800.0     1.227   3523.386     1.000        4.00      0.082      234.89        0.348     386.67    0.00021
TAXI-IDLE    0.060       870.0     7.703   1082.793     1.000        7.00      0.899      126.33        7.114     101.50    0.00885

                                  TOTAL FOR CYCLE:                           3.437     1066.82                 1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            3.221
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           2.482
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         0.249

   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN      NOX         FUEL      LB NOX/      ENERGY    LB NOX/
             POWER       # TH       RATE       RATE     WT FACTOR     MODE        MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                   MIN.        LBS.        LBS.

TAXI-IDLE    0.060       870.0     1.816   1082.793     1.000       19.00      0.575      342.88        1.677     275.50    0.00209
TAKEOFF      1.000     14500.0   137.944   8559.730     1.000        0.70      1.609       99.86       16.115     169.17    0.00951
CLIMBOUT     0.850     12325.0    85.093   7168.734     1.000        2.20      3.120      262.85       11.870     451.92    0.00690
APPROACH     0.400      5800.0    17.923   3523.386     1.000        4.00      1.195      234.89        5.087     386.67    0.00309
TAXI-IDLE    0.060       870.0     1.816   1082.793     1.000        7.00      0.212      126.33        1.677     101.50    0.00209

                                  TOTAL FOR CYCLE:                           6.711     1066.82                 1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            6.291
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           4.847
                                  LBS POLLUTANT/1000K LB TH AT T.O.:       110.989
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DATE:   8/ 6/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ************************************************************************************************************

     CAL ID NUMBER:  330    ENGINE TYPE AND MODEL:  JT8D-9                      SERIAL NUMBER:   P6654088

                         RATED THRUST:        14500.

     ENGINE TOTAL TIME:                              6025. HRS

     TIME SINCE HOT SECTION OVERHAUL:                2937. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                    6025. HRS
          N2 COMPRESSOR OVERHAUL:                    6025. HRS
          COMBUSTOR CAN REPLACEMENT:                 2937. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    2937. HRS
          N1 TURBINE OVERHAUL:                       6025. HRS
          N2 TURBINE OVERHAUL:                       6025. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   1.722

OPERATIONAL DATA ************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   65.00   FINISH   65.00

     ATMOSPHERIC PRESSURE:              START   29.12   FINISH   29.12

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0113

     RELATIVE HUMIDITY:                        83.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   8

COMMENTS:

NO 2 DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.


 ELAPSED   TEST          POWER                   ENGINE            MEASURED   GAS GEN      CALC    COMPRESSOR   ENGINE     TURBINE
  TIME     MODE     THRUST,LBS  PERCENT          SPEED               FUEL     AIR FLOW      F/A    DISCHARGE   PRESSURE     INLET
                        OR        RATED           RPM                FLOW      LB/SEC                TEMP       RATIO       TEMP
                       SHP        T.O.       N1          N2          LB/HR                         DEGREES F     EPR      DEGREES F

   0.0     4/ 0      880.00         6     2730.00    6840.00        930.00     32.90    0.007900     -0.00      -0.00       -0.00
   6.00    7/ 4     1850.00        12     3800.00    8230.00       1570.00     47.50    0.009200     -0.00      -0.00       -0.00
   9.00    8/ 7     2960.00        20     4660.00    8920.00       1840.00     59.60    0.008600     -0.00      -0.00       -0.00
  12.00    9/ 8     4090.00        28     5310.00    9450.00       2420.00     71.70    0.009400     -0.00      -0.00       -0.00
  14.30   10/ 9     5180.00        35     5780.00    9780.00       2950.00     82.30    0.010000     -0.00      -0.00       -0.00
  16.00    1/10     9640.00        66     7580.00   10680.00       5540.00    118.20    0.013000     -0.00      -0.00       -0.00
  19.30    2/ 1    11380.00        78     7710.00   10740.00       6510.00    131.20    0.013800     -0.00      -0.00       -0.00
  22.00    3/ 2    13910.00        95     8190.00   11400.00       8370.00    150.20    0.015500     -0.00      -0.00       -0.00


  POWER    EXHAUST      EXHAUST        CO         CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS         (WET)        2       (WET)     (WET)       2         X
  RATED     TEMP        PRESSURE      PPMV      (WET)      PPMV      PPMV      (WET)     (WET)
  T.O.    DEGREES F       PSIA                 PERCENT V                       PPMV      PPMV

    6      666.00         0.60       362.00      1.65     140.00     11.00      2.00     13.00     -0.00      -0.00     -0.00
   12      698.00         1.30       169.00      1.91      22.00     17.00      5.00     22.00     -0.00      -0.00     -0.00
   20      610.00         2.30        88.00      1.89      13.00     18.00      3.00     21.00     -0.00      -0.00     -0.00
   28      648.00         3.30        55.00      1.94       4.00     22.00      7.00     29.00     -0.00      -0.00     -0.00
   35      685.00         4.30        29.00      2.07       2.00     29.00      6.00     35.00     -0.00      -0.00     -0.00
   66      851.00         9.40        18.00      2.65       0.0      62.00      5.00     67.00     -0.00      -0.00     -0.00
   78      900.00        11.30        11.00      2.80       0.0      76.00      5.00     81.00     -0.00      -0.00     -0.00
   95      993.00        14.70         6.00      3.14       0.0     111.00      8.00    119.00     -0.00      -0.00     -0.00


  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    6      43.39      9.61      0.39    3107.18     2.17      2.55     40.35      8.94      0.37    2889.68     2.01      2.38
   12      17.85      1.33      0.87    3170.01     2.95      3.82     28.03      2.09      1.36    4976.92     4.63      5.99
   20       9.91      0.84      0.55    3183.85     3.33      3.88     18.23      1.54      1.02    5858.27     6.12      7.14
   28       5.76      0.24      1.20    3192.00     3.78      4.99     13.94      0.58      2.91    7724.64     9.16     12.07
   35       2.85      0.11      0.97    3196.93     4.68      5.65      8.41      0.33      2.86    9430.93    13.81     16.67
   66       1.38      0.0       0.63    3199.54     7.83      8.46      7.66      0.0       3.50   17725.44    43.35     46.85
   78       0.80      0.0       0.60    3200.45     9.08      9.68      5.21      0.0       3.89   20834.94    59.12     63.01
   95       0.39      0.0       0.85    3201.19    11.83     12.68      3.26      0.0       7.14   26793.20    99.01    106.15


  POWER          CO                CO               THC               NO               NO               NO
 PERCENT                            2                                                    2                X
  RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

    6          45.451          3283.722          10.156            2.289            0.416            2.705
   12          15.150          2690.227           1.129            2.503            0.736            3.239
   20           6.158          1979.147           0.571            2.069            0.345            2.414
   28           3.408          1898.666           0.142            2.239            0.712            2.951
   35           1.623          1820.643           0.064            2.666            0.552            3.218
   66           0.795          1838.739           0.0              4.497            0.363            4.860
   78           0.458          1830.838           0.0              5.195            0.342            5.537
   95           0.234          1926.183           0.0              7.118            0.513            7.631
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     CAL ID NUMBER:  330   ENGINE TYPE AND MODEL: JT8D-9              SERIAL NUMBER:  P6654088

TEST ORGANIZATION:  S W R I TWA

   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO          FUEL     LB CO /     ENERGY    LB CO /
            POWER        # TH      RATE        RATE     WT FACTOR    MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR       LB/HR                 MIN.       LBS.         LBS.

TAXI-IDLE   0.060        870.0    34.122     790.021     1.000      19.00     10.805       250.17     43.191     275.50    0.03922
TAKEOFF     1.000      14500.0     5.126    8727.305     1.000       0.70      0.060       101.82      0.587     169.17    0.00035
CLIMBOUT    0.850      12325.0     6.353    7091.418     1.000       2.20      0.233       260.02      0.896     451.92    0.00052
APPROACH    0.400       5800.0     9.212    3378.473     1.000       4.00      0.614       225.23      2.727     386.67    0.00159
TAXI-IDLE   0.060        870.0    34.122     790.021     1.000       7.00      3.981        92.17     43.191     101.50    0.03922

                                 TOTAL FOR CYCLE:                             15.693       929.41                1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              16.885
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             11.333
                                 LBS POLLUTANT/1000K LB TH AT T.O.:            0.412


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC          FUEL     LB HC /     ENERGY    LB HC /
            POWER        # TH      RATE        RATE     WT FACTOR    MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR       LB/HR                 MIN.       LBS.         LBS.

TAXI-IDLE   0.060        870.0     6.683     790.021     1.000      19.00      2.116       250.17      8.459     275.50    0.00768
TAKEOFF     1.000      14500.0     0.166    8727.305     1.000       0.70      0.002       101.82      0.019     169.17    0.00001
CLIMBOUT    0.850      12325.0     0.218    7091.418     1.000       2.20      0.008       260.02      0.031     451.92    0.00002
APPROACH    0.400       5800.0     0.289    3378.473     1.000       4.00      0.019       225.23      0.086     386.67    0.00005
TAXI-IDLE   0.060        870.0     6.683     790.021     1.000       7.00      0.780        92.17      8.459     101.50    0.00768

                                 TOTAL FOR CYCLE:                              2.925       929.41                1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               3.147
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              2.112
                                 LBS POLLUTANT/1000K LB TH AT T.O.:            0.134


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX          FUEL     LB NOX/     ENERGY    LB NOX/
            POWER        # TH      RATE        RATE     WT FACTOR    MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR       LB/HR                 MIN.       LBS.         LBS.

TAXI-IDLE   0.060        870.0     2.093     790.021     1.000      19.00      0.663       250.17      2.649     275.50    0.00241
TAKEOFF     1.000      14500.0   117.144    8727.305     1.000       0.70      1.367       101.82     13.423     169.17    0.00808
CLIMBOUT    0.850      12325.0    77.195    7091.418     1.000       2.20      2.830       260.02     10.886     451.92    0.00626
APPROACH    0.400       5800.0    19.496    3378.473     1.000       4.00      1.300       225.23      5.771     386.67    0.00336
TAXI-IDLE   0.060        870.0     2.093     790.021     1.000       7.00      0.244        92.17      2.649     101.50    0.00241

                                 TOTAL FOR CYCLE:                              6.404       929.41                1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               6.890
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              4.625
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           94.253
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DATE:   8/ 9/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA *****************************************************************************************************

     CAL ID NUMBER:  332    ENGINE TYPE AND MODEL:  JT8D-9                 SERIAL NUMBER:   P665704B

                           RATED THRUST:        14500.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   1.722

OPERATIONAL DATA *****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    87.00    FINISH   87.00

     ATMOSPHERIC PRESSURE:              START    29.05    FINISH   29.05

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0121

     RELATIVE HUMIDITY:                        41.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:     1.00

NUMBER OF TESTS:  10

COMMENTS:

 NO2 DETERMINED BY SUBTRACTION.  ENGINE EQUIPPED WITH SMOKELESS BURNER CANS.
 THIS ENGINE WAS NEW, AND WAS USED AS A CALIBRATION ENGINE TO CHECK TWA'S TEST
 CELLS AGAINST PRATT & WHITNEY'S.


 ELAPSED    TEST           POWER                  ENGINE              MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
  TIME      MODE    THRUST,LBS  PERCENT           SPEED                 FUEL     AIR FLOW      F/A      DISCHARGE    PRESSURE      INLET
                        OR       RATED             RPM                  FLOW      LB/SEC                   TEMP        RATIO        TEMP
                       SHP       T.O.        N1          N2            LB/HR                            DEGREES F      EPR      DEGREES F

   0.0      1/ 0     9500.00        65    7330.00   10980.00         5410.00     114.90     0.013100      -0.00        -0.00        -0.00
   6.00     2/ 1    11500.00        79    7660.00   11300.00         6620.00     129.00     0.014200      -0.00        -0.00        -0.00
   8.00     3/ 2    13450.00        92    8170.00   11650.00         8020.00     143.80     0.015500      -0.00        -0.00        -0.00
  12.00     4/ 3      880.00         6    2720.00    6900.00          930.00      32.20     0.008000      -0.00        -0.00        -0.00
  17.00     7/ 4     1260.00         8    3280.00    7650.00         1260.00      36.90     0.009500      -0.00        -0.00        -0.00
  23.00     8/ 7     1500.00        10    3530.00    7990.00         1400.00      39.70     0.009800      -0.00        -0.00        -0.00
  25.00     9/ 8     1760.00        12    3780.00    8280.00         1540.00      43.50     0.009800      -0.00        -0.00        -0.00
  29.00    10/ 9     3000.00        20    4780.00    9130.00         1920.00      58.70     0.009300      -0.00        -0.00        -0.00
  34.00    11/10     5020.00        34    5820.00    9950.00         2940.00      79.00     0.010300      -0.00        -0.00        -0.00
  39.00    12/11     7000.00        48    6550.00   10480.00         3990.00      96.10     0.011500      -0.00        -0.00        -0.00


 POWER     EXHAUST       EXHAUST         CO          CO        THC        NO         NO         NO      ALDEHYDES    SMOKE    PARTICULATES
PERCENT      GAS           GAS          (WET)         2       (WET)      (WET)        2          X
 RATED      TEMP        PRESSURE        PPMV       (WET)      PPMV       PPMV      (WET)      (WET)
  T.O.    DEGREES F       PSIA                   PERCENT V                          PPMV       PPMV

   65      876.00         9.00         15.30        2.67       1.00      66.00       5.00      71.00      -0.00       -0.00       -0.00
   79      960.00        11.30         11.00        2.85       0.0       85.00       5.00      90.00      -0.00       -0.00       -0.00
   92     1024.00        14.10          8.00        3.14       0.0      116.00       5.00     121.00      -0.00       -0.00       -0.00
    6      717.00         0.60        310.00        1.65     113.00      11.00       1.00      12.00      -0.00       -0.00       -0.00
    8      759.00         0.80        234.00        1.96      84.00      13.00       2.00      15.00      -0.00       -0.00       -0.00
   10      770.00         1.10        192.00        1.96      60.00      16.00       1.00      17.00      -0.00       -0.00       -0.00
   12      772.00         1.10        162.00        1.99      46.00      18.00       2.00      20.00      -0.00       -0.00       -0.00
   20      667.00         2.30         86.00        1.92      31.00      19.00       2.00      21.00      -0.00       -0.00       -0.00
   34      718.00         4.10         41.00        2.11      10.00      28.00       4.00      32.00      -0.00       -0.00       -0.00
   48      770.00         6.20         25.00        2.34       4.00      43.00       5.00      48.00      -0.00       -0.00       -0.00


 POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
 RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   65       1.14       0.04       0.63    3199.80       8.27       8.90       6.19       0.24       3.39   17310.84      44.73      48.12
   79       0.79       0.0        0.59    3200.48       9.98      10.57       5.20       0.0        3.89   21187.15      66.06      69.94
   92       0.52       0.0        0.53    3200.90      12.36      12.89       4.16       0.0        4.27   25671.18      99.14     103.41
    6      37.33       7.79       0.20    3121.69       2.18       2.37      34.71       7.25       0.18    2903.17       2.02       2.21
    8      23.93       5.16       0.34    3149.96       2.18       2.52      30.16       6.50       0.42    3968.95       2.75       3.18
   10      19.71       3.53       0.17    3161.07       2.70       2.87      27.59       4.94       0.24    4425.50       3.78       4.01
   12      16.42       2.67       0.33    3168.59       3.00       3.33      25.28       4.11       0.51    4879.63       4.61       5.13
   20       9.07       1.87       0.35    3182.32       3.29       3.64      17.42       3.60       0.67    6110.05       6.32       6.99
   34       3.95       0.55       0.63    3193.99       4.43       5.06      11.61       1.62       1.86    9390.33      13.03      14.89
   48       2.17       0.20       0.71    3197.75       6.14       6.86       8.68       0.80       2.85   12759.02      24.51      27.36


 POWER          CO                 CO                 THC                 NO                 NO                 NO
PERCENT                             2                                                          2                  X
 RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
  T.O.

   65          0.452           1822.199             0.025              4.709              0.357              5.066
   79          0.453           1842.361             0.0                5.744              0.338              6.082
   92          0.309           1908.638             0.0                7.371              0.318              7.689
    6         39.448           3299.053             8.236              2.299              0.209              2.508
    8         23.935           3149.962             5.155              2.184              0.336              2.520
   10         18.194           2950.333             3.292              2.518              0.157              2.675
   12         14.365           2772.520             2.336              2.622              0.291              2.913
   20          5.806           2036.686             1.199              2.107              0.222              2.329
   34          2.313           1870.584             0.323              2.595              0.371              2.966
   48          1.239           1822.717             0.114              3.501              0.407              3.909
  CAL ID NUMBER:  332   ENGINE TYPE AND MODEL: JT8D-9                 SERIAL NUMBER:  P665704B

TEST ORGANIZATION:  S W R I TWA

  MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE     TIME IN     CO        FUEL     LB CO /     ENERGY   LB CO /
            POWER       # TH      RATE      RATE    WT FACTOR    MODE      MASS       MASS   1K LB FUEL   # TH-HR  # TH-HR
                                 LB/HR     LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060      870.0    41.007   1011.297    1.000      19.00    12.985     320.24     40.549     275.50   0.04713
TAKEOFF     1.000    14500.0     5.372   8804.355    1.000       0.70     0.063     102.72      0.610     169.17   0.00037
CLIMBOUT    0.850    12325.0     5.957   7284.480    1.000       2.20     0.218     267.10      0.818     451.92   0.00048
APPROACH    0.400     5800.0    11.322   3487.744    1.000       4.00     0.755     232.52      3.246     386.67   0.00195
TAXI-IDLE   0.060      870.0    41.007   1011.297    1.000       7.00     4.784     117.98     40.549     101.50   0.04713

                         TOTAL FOR CYCLE:                                18.805    1040.56                1384.75
                         LBS POLLUTANT/1K LB FUEL/CYCLE:                 18.072
                         LBS POLLUTANT/1K LB TH-HR/CYCLE:                13.580
                         LBS POLLUTANT/1000K LB TH AT T.O.:               0.432


  MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE     TIME IN     HC        FUEL     LB HC /     ENERGY   LB HC /
            POWER       # TH      RATE      RATE    WT FACTOR    MODE      MASS       MASS   1K LB FUEL   # TH-HR  # TH-HR
                                 LB/HR     LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060      870.0     8.470   1011.297    1.000      19.00     2.682     320.24      8.376     275.50   0.00974
TAKEOFF     1.000    14500.0     0.0     8804.355    1.000       0.70     0.0       102.72      0.0       169.17   0.0
CLIMBOUT    0.850    12325.0     0.148   7284.480    1.000       2.20     0.005     267.10      0.020     451.92   0.00001
APPROACH    0.400     5800.0     1.597   3487.744    1.000       4.00     0.106     232.52      0.458     386.67   0.00028
TAXI-IDLE   0.060      870.0     8.470   1011.297    1.000       7.00     0.988     117.98      8.376     101.50   0.00974

                         TOTAL FOR CYCLE:                                 3.782    1040.56                1384.75
                         LBS POLLUTANT/1K LB FUEL/CYCLE:                  3.635
                         LBS POLLUTANT/1K LB TH-HR/CYCLE:                 2.731
                         LBS POLLUTANT/1000K LB TH AT T.O.:               0.0


  MODE    FRACTIONAL    POWER   EMISSION    FUEL      USAGE     TIME IN     NOX       FUEL     LB NOX/     ENERGY   LB NOX/
            POWER       # TH      RATE      RATE    WT FACTOR    MODE      MASS       MASS   1K LB FUEL   # TH-HR  # TH-HR
                                 LB/HR     LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060      870.0     2.299   1011.297    1.000      19.00     0.728     320.24      2.273     275.50   0.00264
TAKEOFF     1.000    14500.0   123.869   8804.355    1.000       0.70     1.445     102.72     14.069     169.17   0.00854
CLIMBOUT    0.850    12325.0    83.491   7284.480    1.000       2.20     3.061     267.10     11.461     451.92   0.00677
APPROACH    0.400     5800.0    20.300   3487.744    1.000       4.00     1.353     232.52      5.821     386.67   0.00350
TAXI-IDLE   0.060      870.0     2.299   1011.297    1.000       7.00     0.268     117.98      2.273     101.50   0.00264

                         TOTAL FOR CYCLE:                                 6.856    1040.56                1384.75
                         LBS POLLUTANT/1K LB FUEL/CYCLE:                  6.589
                         LBS POLLUTANT/1K LB TH-HR/CYCLE:                 4.951
                         LBS POLLUTANT/1000K LB TH AT T.O.:              99.665
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DATE:   7/12/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:   89    ENGINE TYPE AND MODEL:  JT8D-1                    SERIAL NUMBER:   653301

                            RATED THRUST:       14000.

     ENGINE TOTAL TIME:                                 11982. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          0. HRS
          N2 COMPRESSOR OVERHAUL:                          0. HRS
          COMBUSTOR CAN REPLACEMENT:                       0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
          N1 TURBINE OVERHAUL:                             0. HRS
          N2 TURBINE OVERHAUL:                             0. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   95.00   FINISH   96.00

     ATMOSPHERIC PRESSURE:              START   14.35   FINISH   14.35

     INLET AIR HUMIDITY, LBS H20/LB AIR:   0.0150

     RELATIVE HUMIDITY:                       42.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  122.00,  FLOW RATE, LITERS/MIN:   16.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   6

COMMENTS:

 H/C IS CAL-ESTIMATED
 TEMP. SAMPLE LINE AVERAGED
 A NON-SMOKELESS HOT SECTION
 INSTALLED DURING THIS SHOP VISIT
 TOP ARM OF PROBE FAILED DURING LAST RUN
WITHOUT RETROFIT


 CLOCK      TEST          POWER                  ENGINE            MEASURED   GAS GEN     CALC    COMPRESSOR   ENGINE     TURBINE
  TIME      MODE    THRUST,LBS  PERCENT          SPEED               FUEL     AIR FLOW    F/A     DISCHARGE   PRESSURE    INLET
                        OR       RATED            RPM                FLOW     LB/SEC                TEMP       RATIO      TEMP
                       SHP       T.O.        N1          N2         LB/HR                         DEGREES F     EPR     DEGREES F

  345.00    1/ 0     790.00        5     2745.00    6935.00      1135.00     -0.00   -0.000000     -0.00       1.04       14.33
  400.00    1/ 1     870.00        6     2834.00    7052.00      1065.00     -0.00   -0.000000     -0.00       1.04       14.33
  405.00    5/ 1    8760.00       62     7200.00   11029.00      5290.00     -0.00   -0.000000     -0.00       1.58       14.20
  415.00    4/ 5   10340.00       73     7596.00   11310.00      6260.00     -0.00   -0.000000     -0.00       1.72       14.18
  420.00    3/ 4   11330.00       80     7805.00   11510.00      6860.00     -0.00   -0.000000     -0.00       1.81       14.17
  425.00    2/ 3   12150.00       86     8005.00   11654.00      7440.00     -0.00   -0.000000     -0.00       1.87       14.16


 POWER    EXHAUST      EXHAUST        CO        CO       THC      NO       NO       NO    ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS          GAS         (WET)       2       (WET)    (WET)     2        X
 RATED      TEMP       PRESSURE      PPMV      (WET)     PPMV     PPMV    (WET)    (WET)
 T.O.    DEGREES F       PSIA               PERCENT V                    PPMV     PPMV

   5       730.00       14.90      105.00      0.49     45.40     6.50     3.00     9.50    -0.00     -0.00      -0.00
   6       700.00       14.90      109.00      0.49     47.50     4.90     3.00     7.90     3.38     -0.00      -0.00
  62       870.00       22.55       25.50      1.77      3.50    43.50    10.00    53.50     0.25     -0.00      -0.30
  73       935.00       24.35       27.20      2.07      3.00    32.90    15.00    47.90     0.26     -0.00      -0.00
  80       970.00       25.65       26.20      2.12      2.60    37.80    17.00    54.80     0.12     -0.00      -0.00
  86      1000.00       26.55       27.20      2.22      3.00    41.00    27.00    68.00     0.07     -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   5       41.76     10.34      1.96   3061.91      4.25      6.21     47.40     11.74      2.22   3475.26      4.82      7.04
   6       43.30     10.81      1.96   3058.21      3.20      5.15     46.11     11.51      2.08   3256.99      3.40      5.49
  62        2.89      0.23      1.86   3150.73      8.09      9.96     15.28      1.20      9.84  16667.35     42.82     52.67
  73        2.64      0.17      2.39   3151.29      5.24      7.62     16.50      1.04     14.94  19727.08     32.78     47.72
  80        2.48      0.14      2.64   3151.61      5.87      8.52     17.01      0.97     18.12  21620.[illegible]3     40.30     58.42
  86        2.46      0.16      4.01   3151.60      6.08     10.09     18.28      1.15     29.81  23447.[illegible]2     45.27     75.08


 POWER          CO                CO               THC               NO                NO                NO
PERCENT                            2                                                    2                 X
 RATED    LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

   5          59.995          4399.063            14.857             6.100             2.816             8.916
   6          53.002          3743.672            13.228             3.914             2.396             6.310
  62           1.745          1902.665             0.137             4.888             1.124             6.012
  73           1.596          1907.841             0.101             3.170             1.445             4.615
  80           1.501          1908.211             0.085             3.557             1.600             5.156
  86           1.505          1929.870             0.095             3.726             2.454             6.180
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   CAL ID NUMBER:   89   ENGINE TYPE AND MODEL: JT8D-1             SERIAL NUMBER:  653301

TEST ORGANIZATION:  U.S. BUREAU OF MINES

  MODE   FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     CO         FUEL    LB CO /    ENERGY   LB CO /
           POWER       # TH      RATE      RATE    WT FACTOR   MODE      MASS        MASS   1K LB FUEL  # TH-HR  # TH-HR
                                LB/HR     LB/HR                MIN.      LBS.        LBS.

TAXI-IDLE  0.060       840.0   42.445   1111.696    1.000      19.00   13.441      352.04    38.180    266.00    0.05053
TAKEOFF    1.000     14000.0   13.636   8566.836    1.000       0.70    0.159       99.95     1.592    163.33    0.00097
CLIMBOUT   0.850     11900.0   14.401   7253.754    1.000       2.20    0.528      265.97     1.985    436.33    0.00121
APPROACH   0.400      5600.0   22.901   3601.282    1.000       4.00    1.527      240.09     6.359    373.33    0.00409
TAXI-IDLE  0.060       840.0   42.445   1111.696    1.000       7.00    4.952      129.70    38.180     98.00    0.05053

                        TOTAL FOR CYCLE:                              20.607     1087.74              1337.00
                        LBS POLLUTANT/1K LB FUEL/CYCLE:               18.945
                        LBS POLLUTANT/1K LB TH-HR/CYCLE:              15.413
                        LBS POLLUTANT/1000K LB TH AT T.O.:             1.136

  MODE   FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     HC         FUEL    LB HC /    ENERGY   LB HC /
           POWER       # TH      RATE      RATE    WT FACTOR   MODE      MASS        MASS   1K LB FUEL  # TH-HR  # TH-HR
                                LB/HR     LB/HR                MIN.      LBS.        LBS.

TAXI-IDLE  0.060       840.0   11.848   1111.696    1.000      19.00    3.752      352.04    10.658    266.00    0.01411
TAKEOFF    1.000     14000.0    0.441   8566.836    1.000       0.70    0.005       99.95     0.052    163.33    0.00003
CLIMBOUT   0.850     11900.0    0.604   7253.754    1.000       2.20    0.022      265.97     0.083    436.33    0.00005
APPROACH   0.400      5600.0    2.083   3601.282    1.000       4.00    0.139      240.09     0.579    373.33    0.00037
TAXI-IDLE  0.060       840.0   11.848   1111.696    1.000       7.00    1.382      129.70    10.658     98.00    0.01411

                        TOTAL FOR CYCLE:                               5.301     1087.74              1337.00
                        LBS POLLUTANT/1K LB FUEL/CYCLE:                4.873
                        LBS POLLUTANT/1K LB TH-HR/CYCLE:               3.965
                        LBS POLLUTANT/1000K LB TH AT T.O.:             0.368

  MODE   FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     NOX        FUEL    LB NOX/    ENERGY   LB NOX/
           POWER       # TH      RATE      RATE    WT FACTOR   MODE      MASS        MASS   1K LB FUEL  # TH-HR  # TH-HR
                                LB/HR     LB/HR                MIN.      LBS.        LBS.

TAXI-IDLE  0.060       840.0    5.527   1111.696    1.000      19.00    1.750      352.04     4.972    266.00    0.00658
TAKEOFF    1.000     14000.0  124.353   8566.836    1.000       0.70    1.451       99.95    14.516    163.33    0.00888
CLIMBOUT   0.850     11900.0   68.880   7253.754    1.000       2.20    2.526      265.97     9.496    436.33    0.00579
APPROACH   0.400      5600.0   24.304   3601.282    1.000       4.00    1.620      240.09     6.749    373.33    0.00434
TAXI-IDLE  0.060       840.0    5.527   1111.696    1.000       7.00    0.645      129.70     4.972     98.00    0.00658

                        TOTAL FOR CYCLE:                               7.992     1087.74              1337.00
                        LBS POLLUTANT/1K LB FUEL/CYCLE:                7.347
                        LBS POLLUTANT/1K LB TH-HR/CYCLE:               5.977
                        LBS POLLUTANT/1000K LB TH AT T.O.:           103.627
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DATE:   7/28/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINF DATA ***********************************************************************************************************

    CAL ID NUMBER:  344    ENGINE TYPE AND MODEL:  JT8D-1                          SERIAL NUMBER:   653304

                           RATED THRUST:        14000.

     ENGINE TOTAL TIME:                                 13257. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCF:

          N1 COMPRESSOR OVERHAUL:                        6390. HRS
          N2 COMPRESSOR OVERHAUL:                        6390. HRS
          COMBUSTOR CAN REPLACEMENT:                        0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:           0. HRS
          N1 TURBINE OVFRHAUL:                              0. HRS
          N2 TURBINE OVERHAUL:                              0. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

 OPERATIONAL DATA ******************************************************

     INLET AIR TEMPFRATURE, DEGREES F:  START   81.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   29.31   FINISH   29.31

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0094

     RELATIVE HUMIDITY:                      61.00  PERCENT

     SAMPLE LINF:  TEMPERATURE, DEGREES C:  131.00,  FLOW RATF, LITFRS/MIN:   16.00

     SAMPLE LINE TRANSPORT TIME, SFC:    0.99

 NUMBER OF TESTS:   5

 COMMENTS:

  H/C CAL ESTIMATED
  SAMPLE LINE TEMP. AVERAGED
 WITHOUT RETROFIT


 CLOCK      TEST           POWER                ENGINE           MEASURED   GAS GEN      CALC      COMPRESSOR    ENGINE     TURBINE
 TIME       MODE    THRUST,LBS  PERCENT          SPEED             FUEL     AIR FLOW      F/A      DISCHARGE    PRESSURE     INLET
                        OR      RATED             RPM              FLOW     LB/SEC                    TEMP        RATIO       TEMP
                       SHP      T.O.        N1         N2          LB/HR                           DEGREES F       EPR      DEGREES F

 410.00     2/ 0     9150.00     65     7190.00  10880.00       5460.00     -0.00   -0.000000       -0.00        1.60        -0.00
 415.00     1/ 2      990.00      7     2120.00   7170.00       1075.00     -0.00   -0.000000       -0.00        1.04        -0.00
 420.00     3/ 1    10800.00     77     7580.00  11200.00       6360.00     -0.00   -0.000000       -0.00        1.64        -0.00
 425.00     4/ 3    11960.00     85     7860.00  11400.00       7120.00     -0.00   -0.000000       -0.00        1.85        -0.00
 430.00     5/ 4    12570.00     89     8010.00  11520.00       7610.00     -0.00   -0.000000       -0.00        1.92        -0.00


  POWER    EXHAUST     EXHAUST          CO          CO        THC       NO        NO        NO     ALDEHYDES    SMOKE   PARTICULATES
 PERCENT     GAS         GAS          (WET)          2       (WET)     (WET)       2         X
  RATED      TEMP      PRESSURE        PPMV       (WET)      PPMV      PPMV      (WET)     (WET)
  T.O.    DEGREFS F      PSIA                   PFRCENT V                        PPMV      PPMV

   65       875.00      22.71          19.50       1.98       2.20     60.80      6.00     66.80      0.33      -0.00       -0.00
    7       655.00      14.97         107.00       0.65      51.80      2.40      2.00      4.40      4.10      -0.00       -0.00
   77       940.00      24.24          16.00       2.26       1.90     85.00      8.50     93.50      0.35      -0.00       -0.00
   85       970.00      26.36          15.50       2.46       1.90    105.40      9.50    114.90      0.32      -0.00       -0.00
   89       995.00      27.20          15.00       2.59       1.90    118.50     10.00    128.50      0.41      -0.00       -0.00


  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2        NO        NOX
  RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR      LB/HR     LB/HR     LB/HR
  T.O.    LB FUFL   LB FUEL   LB FUEL   LB FUFL   LB FUEL   LB FUEL

   65        1.98      0.13      1.00   3152.44     10.12     11.12     10.79      0.70      5.45  17212.30     55.25     60.71
    7       32.28      8.95      0.99   3080.63      1.19      2.18     34.70      9.62      1.07   3311.67      1.28      2.34
   77        1.42      0.10      1.24   3153.39     12.40     13.64      9.04      0.61      7.89  20055.56     78.85     86.74
   85        1.26      0.09      1.27   3153.66     14.13     15.40      9.00      0.63      9.06  22454.04    100.57    109.64
   89        1.16      0.08      1.27   3153.83     15.08     16.36      8.85      0.64      9.69  24000.65    114.80    124.48


  POWER          CO              CO              THC               NO               NO               NO
 PERCENT                          2                                                  2                X
  RATED    LB/1K#TH-HR      LB/1K#TH-HR     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

   65          1.179         1891.126           0.076            6.039            0.596            6.635
    7         35.046         3345.124           9.717            1.291            1.076            2.367
   77          0.837         1856.997           0.057            7.301            0.730            8.031
   85          0.753         1877.428           0.053            8.409            0.758            9.167
   89          0.704         1909.360           0.051            9.132            0.771            9.903
   CAL ID NUMBER:  344   ENGINE TYPE AND MODEL: JT8D-1                  SERIAL NUMBER:  653304

TEST ORGANIZATION:  U.S. BUREAU OF MINES

  MODE    FRACTIONAL   POWER   EMISSION    FUEL       USAGE     TIME IN     CO        FUEL     LB CO /    ENERGY   LB CO /
            POWER      # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060      840.0    31.312    951.672    1.000      19.00     9.916     301.36    32.903     266.00   0.03728
TAKEOFF     1.000    14000.0     6.531   8423.043    1.000       0.70     0.076      98.27     0.775     163.33   0.00047
CLIMBOUT    0.850    11900.0     7.572   7216.984    1.000       2.20     0.278     264.62     1.049     436.33   0.00064
APPROACH    0.400     5600.0    22.534   3874.643    1.000       4.00     1.502     258.31     5.816     373.33   0.00402
TAXI-IDLE   0.060      840.0    31.312    951.672    1.000       7.00     3.653     111.03    32.903      98.00   0.03728

                             TOTAL FOR CYCLE:                            15.425    1033.59              1337.00
                             LBS POLLUTANT/1K LB FUEL/CYCLE:             14.924
                             LBS POLLUTANT/1K LB TH-HR/CYCLE:            11.537
                             LBS POLLUTANT/1000K LB TH AT T.O.:           0.544

  MODE    FRACTIONAL   POWER   EMISSION    FUEL       USAGE     TIME IN     HC        FUEL     LB HC /    ENERGY   LB HC /
            POWER      # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060      840.0     8.741    951.672    1.000      19.00     2.768     301.36     9.185     266.00   0.01041
TAKEOFF     1.000    14000.0     0.138   8423.043    1.000       0.70     0.002      98.27     0.016     163.33   0.00001
CLIMBOUT    0.850    11900.0     0.299   7216.984    1.000       2.20     0.011     264.62     0.041     436.33   0.00003
APPROACH    0.400     5600.0     2.229   3874.643    1.000       4.00     0.149     258.31     0.575     373.33   0.00040
TAXI-IDLE   0.060      840.0     8.741    951.672    1.000       7.00     1.020     111.03     9.185      98.00   0.01041

                             TOTAL FOR CYCLE:                             3.949    1033.59              1337.00
                             LBS POLLUTANT/1K LB FUEL/CYCLE:              3.821
                             LBS POLLUTANT/1K LB TH-HR/CYCLE:             2.954
                             LBS POLLUTANT/1000K LB TH AT T.O.:           0.115

  MODE    FRACTIONAL   POWER   EMISSION    FUEL       USAGE     TIME IN     NOX       FUEL     LB NOX/    ENERGY   LB NOX/
            POWER      # TH      RATE      RATE     WT FACTOR    MODE      MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                LB/HR     LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060      840.0     1.837    951.672    1.000      19.00     0.582     301.36     1.930     266.00   0.00219
TAKEOFF     1.000    14000.0   156.399   8423.043    1.000       0.70     1.825      98.27    18.568     163.33   0.01117
CLIMBOUT    0.850    11900.0   110.335   7216.984    1.000       2.20     4.046     264.62    15.288     436.33   0.00927
APPROACH    0.400     5600.0    30.704   3874.643    1.000       4.00     2.047     258.31     7.924     373.33   0.00548
TAXI-IDLE   0.060      840.0     1.837    951.672    1.000       7.00     0.214     111.03     1.930      98.00   0.00219

                             TOTAL FOR CYCLE:                             8.713    1033.59              1337.00
                             LBS POLLUTANT/1K LB FUEL/CYCLE:              8.430
                             LBS POLLUTANT/1K LB TH-HR/CYCLE:             6.517
                             LBS POLLUTANT/1000K LB TH AT T.O.:         130.332
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DATE:   7/19/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA ******************************************************************************************************

    CAL ID NUMBER:  295    ENGINE TYPE AND MODEL:  JT8D-1                         SERIAL NUMBER:   649131

                         RATED THRUST:        14000.

    ENGINE TOTAL TIME:                                14443. HRS

    TIME SINCE HOT SECTION OVERHAUL:                   3948. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                       5712. HRS
         N2 COMPRESSOR OVERHAUL:                       5712. HRS
         COMBUSTOR CAN REPLACEMENT:                    3948. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       3948. HRS
         N1 TURBINE OVERHAUL:                          3948. HRS
         N2 TURBINE OVERHAUL:                          3948. HRS

    FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   78.00   FINISH   78.00

     ATMOSPHERIC PRESSURE:              START   29.35   FINISH   29.35

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0109

     RELATIVE HUMIDITY:                      51.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  101.00,  FLOW RATE, LITERS/MIN:   16.00

     SAMPLE LINE TRANSPORT TIME, SEC:    0.99

NUMBER OF TESTS:   6

COMMENTS:

 H/C IS CAL TEMP. AVERAGED
3-ARM PROBE USED
WITHOUT RETROFIT


 CLOCK     TEST          POWER                  ENGINE             MEASURED   GAS GEN       CALC     COMPRESSOR    ENGINE      TURBINE
 TIME      MODE    THRUST,LBS  PERCENT          SPEED                FUEL    AIR FLOW       F/A      DISCHARGE    PRESSURE      INLET
                       OR       RATED            RPM                 FLOW     LB/SEC                    TEMP        RATIO        TEMP
                      SHP       T.O.        N1          N2           LB/HR                           DEGREES F      EPR      DEGREES F

 215.00    4/ 0    1000.00        7     2965.00     7089.00        990.00     -0.00    -0.000000       -0.00        1.04        -0.00
 220.00    1/ 4   10960.00       78     7539.00    11248.00       6260.00     -0.00    -0.000000       -0.00        1.78        -0.00
 225.00    2/ 1   12050.00       86     7796.00    11449.00       6950.00     -0.00    -0.000000       -0.00        1.86        -0.00
 230.00    3/ 2   12790.00       91     7970.00    11580.00       7410.00     -0.00    -0.000000       -0.00        1.93        -0.00
 235.00    5/ 3    9410.00       67     7205.00    11040.00       5310.00     -0.00    -0.000000       -0.00        1.63        -0.00
 235.00    4/ 5    1030.00        7     2120.00     7194.00        980.00     -0.00    -0.000000       -0.00        1.04        -0.00


 POWER    EXHAUST     EXHAUST         CO          CO        THC        NO         NO          NO       ALDEHYDES    SMOKE    PARTICULATES
PERCENT     GAS         GAS          (WET)        2        (WET)     (WET)        2           X
 RATED     TEMP      PRESSURE        PPMV       (WET)      PPMV      PPMV       (WET)       (WET)
 T.O.   DEGREES F      PSIA                   PERCENT V                          PPMV        PPMV

   7      690.00       14.99        183.00       3.71      47.50      1.60       5.50        7.10        5.28       -0.00       -0.00
  78      960.00       25.10         29.20       2.02       3.20     58.90      15.00       73.90        0.25       -0.00       -0.00
  86      975.00       26.35         26.80       2.16       2.60     72.70      15.00       87.70        0.24       -0.00       -0.00
  91     1005.30       27.35         27.20       2.26       2.20     81.90      24.00      105.90        0.14       -0.00       -0.00
  67      875.00       23.17         32.30       1.70       2.20     42.90      18.00       60.90        0.17       -0.00       -0.00
   7      700.00       14.99        153.00       0.69      44.80      3.90       6.00        9.90       -0.00       -0.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO       NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR      LB/HR     LB/HR
 T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   7       49.87     13.66      2.46   3040.07      0.72      3.18     49.37     13.52      2.44   3009.66      0.71      3.15
  78        2.99      0.18      2.45   3150.84      9.60     12.05     18.15      1.14     15.31  19724.23     60.12     75.44
  86        2.49      0.14      2.29   3151.60     11.09     13.39     17.30      0.96     15.90  21903.62     77.07     92.97
  91        2.41      0.11      3.50   3151.70     11.94     15.44     17.89      0.83     25.93  23354.75     88.48    114.41
  67        3.81      0.15      3.49   3149.50      8.31     11.79     20.22      0.79     18.51  16723.84     44.12     62.63
   7       49.42     11.99      3.18   3045.34      2.07      5.25     48.44     11.75      3.12   2984.44      2.03      5.15


 POWER          CO              CO             THC              NO              NO              NO
PERCENT                         2                                               2               X
 RATED     LB/1K*TH-HR     LB/1K*TH-HR     LB/1K*TH-HR     LB/1K*TH-HR     LB/1K*TH-HR     LB/1K*TH-HR
 T.O.

   7          49.371        3009.665          13.529           0.709           2.437           3.146
  78           1.656        1799.656           0.104           5.486           1.397           6.883
  86           1.435        1817.728           0.080           6.396           1.320           7.715
  91           1.399        1824.016           0.065           6.918           2.027           8.945
  67           2.149        1777.241           0.084           4.689           1.967           6.656
   7          47.025        2897.511          11.497           1.969           3.029           4.998
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    CAL ID NUMBER:  295   ENGINE TYPE AND MODEL: JT8D-1              SERIAL NUMBER:  649131

TEST ORGANIZATION:  U.S. BUREAU OF MINES

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL      LB CO /    ENERGY    LB CO /
             POWER      # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060       840.0    41.611     836.814     1.000      19.00     13.177      264.99     49.725     266.00    0.04954
TAKEOFF     1.000     14000.0    15.490    8278.098     1.000       0.70      0.181       96.58      1.871     163.33    0.00111
CLIMBOUT    0.850     11900.0    18.173    6954.324     1.000       2.20      0.666      254.99      2.613     436.33    0.00153
APPROACH    0.400      5600.0    34.553    3309.290     1.000       4.00      2.304      220.62     10.441     373.33    0.00617
TAXI-IDLE   0.060       840.0    41.611     836.814     1.000       7.00      4.855       97.63     49.725      98.00    0.04954

                                TOTAL FOR CYCLE:                             21.182      934.81               1337.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:              22.659
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:             15.843
                                LBS POLLUTANT/1000K LB TH AT T.O.:            1.291


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL      LB HC /    ENERGY    LB HC /
             POWER      # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060       840.0    11.577     836.814     1.000      19.00      3.666      264.99     13.835     266.00    0.01378
TAKEOFF     1.000     14000.0     0.234    8278.098     1.000       0.70      0.003       96.58      0.028     163.33    0.00002
CLIMBOUT    0.850     11900.0     0.381    6954.324     1.000       2.20      0.014      254.99      0.055     436.33    0.00003
APPROACH    0.400      5600.0     2.879    3309.290     1.000       4.00      0.192      220.62      0.870     373.33    0.00051
TAXI-IDLE   0.060       840.0    11.577     836.814     1.000       7.00      1.351       97.63     13.835      98.00    0.01378

                                TOTAL FOR CYCLE:                              5.225      934.81               1337.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:               5.590
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:              3.908
                                LBS POLLUTANT/1000K LB TH AT T.O.:            0.195


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX         FUEL      LB NOX/    ENERGY    LB NOX/
             POWER      # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060       840.0     2.576     836.814     1.000      19.00      0.816      264.99      3.079     266.00    0.00307
TAKEOFF     1.000     14000.0   155.731    8278.098     1.000       0.70      1.817       96.58     18.812     163.33    0.01112
CLIMBOUT    0.850     11900.0    93.248    6954.324     1.000       2.20      3.419      254.99     13.409     436.33    0.00784
APPROACH    0.400      5600.0    26.997    3309.290     1.000       4.00      1.800      220.62      8.158     373.33    0.00482
TAXI-IDLE   0.060       840.0     2.576     836.814     1.000       7.00      0.301       97.63      3.079      98.00    0.00307

                                TOTAL FOR CYCLE:                              8.152      934.81               1337.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:               8.721
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:              6.097
                                LBS POLLUTANT/1000K LB TH AT T.O.:          129.776
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DATE:   6/29/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ***************************************************************************************************************

    CAL ID NUMBER:  122    ENGINE TYPE AND MODEL:  JT8D-7                      SERIAL NUMBER:    654623

                             RATED THRUST:        14000.

    ENGINE TOTAL TIME:                                 9768. HRS

    TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                     11173. HRS
         N2 COMPRESSOR OVERHAUL:                     11574. HRS
         COMBUSTOR CAN REPLACEMENT:                      0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
         N1 TURBINE OVERHAUL:                            0. HRS
         N2 TURBINE OVERHAUL:                            0. HRS

    FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   56.30   FINISH   55.40

    ATMOSPHERIC PRESSURE:              START   29.95   FINISH   30.00

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0066

    RELATIVE HUMIDITY:                   69.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    1.50

    SAMPLE LINE TRANSPORT TIME, SEC:    5.00

 NUMBER OF TESTS:   4

 COMMENTS:

  EXHAUST GAS PRESSURE IN INCHES HG


 CLOCK      TEST         POWER                     ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
  TIME      MODE     THRUST,LBS  PERCENT           SPEED               FUEL     AIR FLOW      F/A      DISCHARGE    PRESSURE      INLET
                         OR       RATED             RPM                FLOW      LB/SEC                   TEMP        RATIO        TEMP
                        SHP       T.O.        N1          N2           LB/HR                           DEGREES F       EPR      DEGREES F
                                                                                                          -0.00        1.75        -0.00
 2355.00    1/ 0     11050.00       78     7380.00  10927.00         6291.00      -0.00   -0.000000       -0.00        1.84        -0.00
    5.00    2/ 1     12100.00       86     7617.00  11121.00         6966.00      -0.00   -0.000000       -0.00        1.98        -0.00
   10.00    3/ 2     13700.00       97     8010.00  11387.00         8083.00      -0.00   -0.000000       -0.00       -0.00        -0.00
  235.00    4/ 3      1100.00        7     2960.00  11300.00          593.00      -0.00   -0.000000


 POWER     EXHAUST      EXHAUST          CO          CO        THC       NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
PERCENT      GAS          GAS           (WET)          2       (WET)    (WET)        2           X
 RATED       TEMP       PRESSURE        PPMV       (WET)       PPMV     PPMV       (WET)       (WET)
 T.O.     DEGREES F       PSIA                    PERCENT V                         PPMV        PPMV
                                                                                                55.00      -0.00       -0.00       -0.00
  78        878.00        52.50         95.00       1.70       5.40     53.80      -0.00      121.00      -0.00       -0.00       -0.00
  86        914.00        55.10         95.00       2.50       4.50    120.00      -0.00      155.00      -0.00       -0.00       -0.00
  97        978.80        59.30         95.00       2.78       4.20    152.50      -0.00        4.50      -0.00       -0.00       -0.00
   7        665.60        31.80        133.00       0.47      16.50      1.25      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL
                                                                        70.20      2.29     -0.00  19737.14     65.30     66.75
  78       11.16      0.36     -0.00   3137.36     10.38     10.61     52.96      1.44     -0.00  21896.78    109.88    110.79
  86        7.60      0.21     -0.00   3143.38     15.77     15.90     55.28      1.40     -0.00  25418.35    145.77    148.15
  97        6.84      0.17     -0.00   3144.67     18.03     18.33     32.67      2.37     -0.00   1813.75      0.50      1.82
   7       55.09      3.91     -0.00   3058.60      0.85      3.06


 POWER          CO                CO                THC               NO                NO               NO
PERCENT                             2                                                      2                X
 RATED      LB/1K#TH-HR      LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR
 T.O.

  78             6.353          1786.166            0.207             5.909           -0.000            6.041
  86             4.377          1809.651            0.119             9.081           -0.000            9.156
  97             4.035          1855.354            0.102            10.640           -0.000           10.814
   7            29.696          1648.864            2.110             0.458           -0.000            1.650
   CAL ID NUMBER:  122   ENGINE TYPE AND MODEL: JT8D-7               SERIAL NUMBER:   654623

TEST ORGANIZATION:  UNITED/EPA

  MODE   FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /    ENERGY   LB CO /
           POWER       # TH      RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                LB/HR      LB/HR                  MIN.       LBS.       LBS.
                                                                                       150.07     59.142    266.00    0.03337
TAXI-IDLE   0.060      840.0   28.028    473.920     1.000       19.00      8.876       94.93      6.379    163.33    0.00371
TAKEOFF     1.000    14000.0   51.908   8137.016     1.000        0.70      0.606      251.30      7.371    436.33    0.00425
CLIMBOUT    0.850    11900.0   50.516   6853.508     1.000        2.20      1.852      220.59     15.003    373.33    0.00886
APPROACH    0.400     5600.0   49.644   3308.871     1.000        4.00      3.310       55.29     59.142     98.00    0.03337
TAXI-IDLE   0.060      840.0   28.028    473.920     1.000        7.00      3.270
                                                                                       772.18              1337.00
                             TOTAL FOR CYCLE:                              17.913
                             LBS POLLUTANT/1K LB FUEL/CYCLE:               23.198
                             LBS POLLUTANT/1K LB TH-HR/CYCLE:              13.398
                             LBS POLLUTANT/1000K LB TH AT T.O.:             4.326


  MODE   FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /    ENERGY   LB HC /
           POWER       # TH      RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                LB/HR      LB/HR                  MIN.       LBS.       LBS.
                                                                                       150.07      4.778    266.00    0.00270
TAXI-IDLE   0.060      840.0    2.264    473.920     1.000       19.00      0.717       94.93      0.109    163.33    0.00006
TAKEOFF     1.000    14000.0    0.888   8137.016     1.000        0.70      0.010      251.30      0.168    436.33    0.00011
CLIMBOUT    0.850    11900.0    1.288   6853.508     1.000        2.20      0.047      220.59      0.482    373.33    0.00028
APPROACH    0.400     5600.0    1.994   3308.871     1.000        4.00      0.106       55.29      4.778     98.00    0.00270
TAXI-IDLE   0.060      840.0    2.264    473.920     1.000        7.00      0.264
                                                                                       772.18              1337.00
                             TOTAL FOR CYCLE:                               1.145
                             LBS POLLUTANT/1K LB FUEL/CYCLE:                1.483
                             LBS POLLUTANT/1K LB TH-HR/CYCLE:               0.856
                             LBS POLLUTANT/1000K LB TH AT T.O.:             0.740


  MODE   FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/    ENERGY   LB NOX/
           POWER       # TH      RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                LB/HR      LB/HR                  MIN.       LBS.       LBS.
                                                                                       150.07      2.457    266.00    0.00139
TAXI-IDLE   0.060      840.0    1.164    473.920     1.000       19.00      0.369       94.93     18.822    163.33    0.01094
TAKEOFF     1.000    14000.0  193.156   8137.016     1.000        0.70      1.787      251.30     15.638    436.33    0.00901
CLIMBOUT    0.850    11900.0  107.178   6853.508     1.000        2.20      3.930      220.59      8.589    373.33    0.00507
APPROACH    0.400     5600.0   28.418   3308.871     1.000        4.00      1.895       55.29      2.457     98.00    0.00139
TAXI-IDLE   0.060      840.0    1.164    473.920     1.000        7.00      0.136
                                                                                       772.18              1337.00
                             TOTAL FOR CYCLE:                               8.116
                             LBS POLLUTANT/1K LB FUEL/CYCLE:               10.510
                             LBS POLLUTANT/1K LB TH-HR/CYCLE:               6.070
                             LBS POLLUTANT/1000K LB TH AT T.O.:           127.630
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DATE: 7/ 2/71

TEST ORGANIZATION: UNITED/EPA

ENGINE SUPPLIER: UNITED AIRLINES

ENGINE DATA **

CAL ID NUMBER: 127 ENGINE TYPE AND MODEL: JT8D-7 SERIAL NUMBER: 636065

RATED THRUST: 14000.

ENGINE TOTAL TIME: 3229. HRS

TIME SINCE HOT SECTION OVERHAUL: 3355. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 9077. HRS
N2 COMPRESSOR OVERHAUL: 2832. HRS
COMBUSTOR CAN REPLACEMENT: 0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 3355. HRS
N1 TURBINE OVERHAUL: 3229. HRS
N2 TURBINE OVERHAUL: 0. HRS

FUEL: JET - A FUEL H/C RATIO: 1.920

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 54.86 FINISH 54.14

ATMOSPHERIC PRESSURE: START 29.91 FINISH 29.97

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0060

RELATIVE HUMIDITY: 65.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 160.00, FLOW RATE, LITERS/MIN: 1.50

SAMPLE LINE TRANSPORT TIME, SEC: 5.00

NUMBER OF TESTS: 4

COMMENTS:

EXHAUST GAS PRESSURE IN INCHES HG.

CLOCK TIME	TEST MODE	POWER THRUST, LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
28.00	1/ 0	10974.00	78	7356.00	10875.00	6293.00	-0.00	-0.000000	-0.00	1.75	-0.00
32.00	2/ 1	12178.00	86	7633.00	11075.00	7059.00	-0.00	-0.000000	-0.00	1.85	-0.00
36.00	3/ 2	13439.00	95	7940.00	11289.00	7934.00	-0.00	-0.000000	-0.00	1.96	-0.00
150.00	4/ 3	935.00	6	2831.00	6939.00	1073.00	-0.00	-0.000000	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
78	887.00	52.20	25.00	2.14	1.20	8.60	-0.00	91.00	-0.00	-0.00	-0.00
86	924.80	55.30	20.00	2.25	0.75	103.00	-0.00	108.00	-0.00	-0.00	-0.00
95	968.00	58.50	20.00	2.45	0.30	125.00	-0.00	131.00	-0.00	-0.00	-0.00
6	649.40	31.40	90.00	0.48	42.00	4.00	-0.00	4.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
78	2.34	0.06	-0.00	3152.03	1.32	14.01	14.75	0.41	-0.00	19835.73	8.33	88.18
86	1.78	0.04	-0.00	3152.98	15.09	15.82	12.59	0.27	-0.00	22256.89	106.51	111.68
95	1.54	0.01	-0.00	3153.28	16.82	17.63	13.00	0.11	-0.00	25018.09	133.44	139.84
6	36.65	9.80	-0.00	3071.42	2.68	2.68	39.33	10.51	-0.00	3295.64	2.87	2.87

POWER PERCENT RATED T.O.	CO LB/1K*TH-HR	CO_2 LB/1K*TH-HR	THC LB/1K*TH-HR	NO LB/1K*TH-HR	NO_2 LB/1K*TH-HR	NO_x LB/1K*TH-HR
78	1.344	1807.520	0.037	0.759	-0.000	8.035
86	1.034	1827.631	0.022	8.746	-0.000	9.171
95	0.967	1861.604	0.008	9.429	-0.000	10.406
6	42.062	3524.766	11.242	3.071	-0.000	3.071

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   CAL ID NUMBER:  127   ENGINE TYPE AND MODEL: JT8D-7                  SERIAL NUMBER:   656065

TEST ORGANIZATION:  UNITED/EPA

   MODE    FRACTIONAL    POWER    EMISSION    FUEL        USAGE     TIME IN     CO        FUEL     LB CO /     ENERGY    LB CO /
              POWER      # TH      RATE       RATE      WT FACTOR    MODE      MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060        840.0    36.131    972.871     1.000       19.00    11.441     308.08     37.138     266.00    0.04301
TAKEOFF     1.000      14000.0     9.301   8285.004     1.000        0.70     0.109      96.66      1.123     163.33    0.00066
CLIMBOUT    0.850      11900.0    11.730   6939.211     1.000        2.20     0.430     254.44      1.690     436.33    0.00099
APPROACH    0.400       5600.0    26.452   3372.059     1.000        4.00     1.763     224.80      7.845     373.33    0.00472
TAXI-IDLE   0.060        840.0    36.131    972.871     1.000        7.00     4.215     113.50     37.138      98.00    0.04301

                                 TOTAL FOR CYCLE:                            17.959     997.48                1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             18.004
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            13.432
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           0.775

   MODE    FRACTIONAL    POWER    EMISSION    FUEL        USAGE     TIME IN     HC        FUEL     LB HC /     ENERGY    LB HC /
              POWER      # TH      RATE       RATE      WT FACTOR    MODE      MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060        840.0     8.820    972.871     1.000       19.00     2.793     308.08      9.066     266.00    0.01050
TAKEOFF     1.000      14000.0     0.0     8285.004     1.000        0.70     0.0        96.66      0.0       163.33    0.0
CLIMBOUT    0.850      11900.0     0.219   6939.211     1.000        2.20     0.008     254.44      0.032     436.33    0.00002
APPROACH    0.400       5600.0     1.667   3372.059     1.000        4.00     0.111     224.80      0.494     373.33    0.00030
TAXI-IDLE   0.060        840.0     8.820    972.871     1.000        7.00     1.029     113.50      9.066      98.00    0.01050

                                 TOTAL FOR CYCLE:                             3.941     997.48                1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              3.951
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             2.948
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           0.0

   MODE    FRACTIONAL    POWER    EMISSION    FUEL        USAGE     TIME IN     NOX       FUEL     LB NOX/     ENERGY    LB NOX/
              POWER      # TH      RATE       RATE      WT FACTOR    MODE      MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060        840.0     2.406    972.871     1.000       19.00     0.762     308.08      2.473     266.00    0.00286
TAKEOFF     1.000      14000.0   154.669   8285.004     1.000        0.70     1.804      96.66     18.669     163.33    0.01105
CLIMBOUT    0.850      11900.0   106.596   6939.211     1.000        2.20     3.909     254.44     15.361     436.33    0.00896
APPROACH    0.400       5600.0    28.600   3372.059     1.000        4.00     1.907     224.80      8.481     373.33    0.00511
TAXI-IDLE   0.060        840.0     2.406    972.871     1.000        7.00     0.281     113.50      2.473      98.00    0.00286

                                 TOTAL FOR CYCLE:                             8.662     997.48                1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              8.684
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             6.479
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         128.891
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DATE: 7/28/71

TEST ORGANIZATION: U.S. BUREAU OF MINES

ENGINE SUPPLIER: AMERICAN AIRLINES

ENGINE DATA **

CAL ID NUMBER: 345 ENGINE TYPE AND MODEL: JT8D-7 SERIAL NUMBER: 654462

RATED THRUST: 14000.

ENGINE TOTAL TIME: 9898. HRS

TIME SINCE HOT SECTION OVERHAUL: 4917. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	9898. HRS
N2 COMPRESSOR OVERHAUL:	9898. HRS
COMBUSTOR CAN REPLACEMENT:	3718. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	4917. HRS
N1 TURBINE OVERHAUL:	9898. HRS
N2 TURBINE OVERHAUL:	-0. HRS

FUEL: JP-4 FUEL H/C RATIO: 0.0

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 73.00 FINISH 73.00

ATMOSPHERIC PRESSURE: START 29.29 FINISH 29.29

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0144

RELATIVE HUMIDITY: 79.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 136.0C, FLOW RATE, LITERS/MIN: 16.00

SAMPLE LINE TRANSPORT TIME, SEC: 0.99

NUMBER OF TESTS: 6

COMMENTS:

H/C CAL ESTIMATED
SAMPLE LINE TEMP. AVERAGED
ENGINE DID NOT LITE OFF ON FIRST TWO ATTEMPTS
THUS A LARGE AMOUNT OF RAW FUELSOAKED PROBE BEFORE FIRST IDLE MODE
PROBE LOCATED 10" FROM TAILPIPE
FIRST IDLE MODE UNTRIMMED
WITHOUT RETROFIT

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
940.00	1/ 0	740.00	5	2580.00	6650.00	960.00	-0.00	0.0	-0.00	1.04	-0.00
955.00	5/ 1	9750.00	69	7275.00	11060.00	5740.00	-0.00	0.0	-0.00	1.67	-0.00
1010.00	1/ 5	1000.00	7	2900.00	7150.00	1110.00	-0.00	0.0	-0.00	1.04	-0.00
1015.00	4/ 1	10940.00	78	7530.00	11250.00	6520.00	-0.00	0.0	-0.00	1.76	-0.00
1020.00	3/ 4	12060.00	86	7780.00	11480.00	7230.00	-0.00	0.0	-0.00	1.86	-0.00
1030.00	2/ 3	12960.00	92	7990.00	11620.00	7860.00	-0.00	0.0	-0.00	1.94	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO 2 (WET) PPMV	NO X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
5	730.00	14.81	153.30	0.51	127.40	2.90	2.00	4.90	-0.00	-0.00	-0.00
69	910.00	23.49	29.00	2.02	1.70	47.20	24.00	71.20	0.34	-0.00	-0.00
7	710.00	14.81	131.00	0.53	67.09	3.90	7.00	10.90	4.25	-0.00	-0.00
78	960.00	24.92	33.20	2.31	1.50	56.20	40.00	96.20	0.41	-0.00	-0.00
86	1000.00	26.77	34.20	2.54	1.50	67.10	51.00	118.10	0.56	-0.00	-0.00
92	1035.00	27.37	36.20	2.72	1.50	78.50	60.00	138.50	0.61	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
5	66.32	31.63	1.42	3473.47	2.06	3.49	63.67	30.36	1.37	3334.53	1.98	3.35
69	3.34	0.11	4.54	3658.89	8.94	13.48	19.19	0.64	26.09	21002.00	51.30	77.39
7	55.57	16.28	4.88	3532.48	2.72	7.59	61.68	18.07	5.41	3921.05	3.02	8.43
78	3.35	0.09	6.62	3658.95	9.31	15.93	21.82	0.56	43.19	23856.34	60.68	103.86
86	3.14	0.08	7.68	3659.30	10.11	17.79	22.67	0.57	55.53	26456.75	73.06	128.60
92	3.10	0.07	8.44	3659.38	11.04	19.48	24.36	0.58	66.33	28762.69	86.78	153.11

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO 2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO 2 LB/1K#TH-HR	NO X LB/1K#TH-HR
5	86.037	4506.125	41.031	2.679	1.847	4.526
69	1.968	2154.052	0.066	5.262	2.675	7.937
7	61.682	3921.048	18.068	3.016	5.414	8.430
78	1.995	2180.653	0.052	5.546	3.947	9.494
86	1.880	2193.760	0.047	6.038	4.605	10.663
92	1.880	2219.343	0.045	6.696	5.118	11.814

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     CAL ID NUMBER:  345   ENGINE TYPE AND MODEL: JT8D-7                   SERIAL NUMBER:  654462

TEST ORGANIZATION:  U.S. BUREAU OF MINES

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN      CO         FUEL     LB CO /     ENERGY    LB CO /
            POWER       # TH       RATE       RATE     WT FACTOR     MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.       LBS.        LBS.

TAXI-IDLE   0.060       840.0    63.311    1072.087     1.000       19.00     20.048      339.49     59.054     266.00     0.07537
TAKEOFF     1.000     14000.0    24.687    8639.383     1.000        0.70      0.288      100.79      2.858     163.33     0.00176
CLIMBOUT    0.850     11900.0    21.938    7313.523     1.000        2.20      0.804      268.16      3.000     436.33     0.00184
APPROACH    0.400      5600.0    40.093    3367.071     1.000        4.00      2.673      224.47     11.907     373.33     0.00716
TAXI-IDLE   0.060       840.0    63.311    1072.087     1.000        7.00      7.386      125.08     59.054      98.00     0.07537

                                TOTAL FOR CYCLE:                              31.200     1058.00               1337.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:               29.490
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:              23.336
                                LBS POLLUTANT/1000K LB TH AT T.O.:             2.057

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN      HC         FUEL     LB HC /     ENERGY    LB HC /
            POWER       # TH       RATE       RATE     WT FACTOR     MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.       LBS.        LBS.

TAXI-IDLE   0.060       840.0    23.697    1072.087     1.000       19.00      7.504      339.49     22.104     266.00     0.02821
TAKEOFF     1.000     14000.0     0.0      8639.383     1.000        0.70      0.0        100.79      0.0       163.33     0.0
CLIMBOUT    0.850     11900.0     0.0      7313.523     1.000        2.20      0.0        268.16      0.0       436.33     0.0
APPROACH    0.400      5600.0     6.350    3367.071     1.000        4.00      0.423      224.47      1.886     373.33     0.00113
TAXI-IDLE   0.060       840.0    23.697    1072.087     1.000        7.00      2.765      125.08     22.104      98.00     0.02821

                                TOTAL FOR CYCLE:                              10.692     1058.00               1337.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:               10.106
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:               7.997
                                LBS POLLUTANT/1000K LB TH AT T.O.:             0.0

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN     NOX         FUEL     LB NOX/     ENERGY    LB NOX/
            POWER       # TH       RATE       RATE     WT FACTOR     MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.       LBS.        LBS.

TAXI-IDLE   0.060       840.0     4.032    1072.087     1.000       19.00      1.277      339.49      3.761     266.00     0.00480
TAKEOFF     1.000     14000.0   188.663    8639.383     1.000        0.70      2.201      100.79     21.838     163.33     0.01348
CLIMBOUT    0.850     11900.0   128.360    7313.523     1.000        2.20      4.707      268.16     17.551     436.33     0.01079
APPROACH    0.400      5600.0    32.695    3367.071     1.000        4.00      2.180      224.47      9.710     373.33     0.00584
TAXI-IDLE   0.060       840.0     4.032    1072.087     1.000        7.00      0.470      125.08      3.761      98.00     0.00480

                                TOTAL FOR CYCLE:                              10.834     1058.00               1337.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:               10.241
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:               8.104
                                LBS POLLUTANT/1000K LB TH AT T.O.:           157.219
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DATE:   7/29/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA *****************************************************************************************************************

     CAL ID NUMBER:  346    ENGINE TYPE AND MODEL:  JT8D-7                         SERIAL NUMBER:   654992

                            RATED THRUST:        14000.

     ENGINE TOTAL TIME:                                  5804. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    2161. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        5804. HRS
          N2 COMPRESSOR OVERHAUL:                        5804. HRS
          COMBUSTOR CAN REPLACEMENT:                     2161. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        2161. HRS
          N1 TURBINE OVERHAUL:                           5804. HRS
          N2 TURBINE OVERHAUL:                            580. HRS

     FUEL: JET - A               FUEL H/C RATIO:   1.920

OPERATIONAL DATA *********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   67.00   FINISH   68.00

     ATMOSPHERIC PRESSURE:              START   29.30   FINISH   29.30

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0110

     RELATIVE HUMIDITY:                        78.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  137.00,  FLOW RATE, LITERS/MIN:   16.00

     SAMPLE LINE TRANSPORT TIME, SEC:    0.99

NUMBER OF TESTS:   4

COMMENTS:

 H/C CAL ESTIMATED
 SAMPLE LINE TEMP. AVERAGED
 PROBE LOCATED 10" FROM TAILPIPE
WITHOUT RETROFIT


 CLOCK     TEST         POWER               ENGINE           MEASURED    GAS GEN     CALC     COMPRESSOR    ENGINE      TURBINE
  TIME     MODE   THRUST,LBS  PERCENT        SPEED             FUEL     AIR FLOW     F/A      DISCHARGE    PRESSURE      INLET
                     OR        RATED          RPM              FLOW      LB/SEC                  TEMP        RATIO        TEMP
                     SHP       T.O.       N1        N2         LB/HR                          DEGREES F      EPR      DEGREES F

 820.00    4/ 0   10780.00      76     7490.00  11130.00     6280.00     -0.00   -0.000000      -0.00        1.75         -0.00
 825.00    3/ 4   12060.00      86     7800.00  11360.00     7110.00     -0.00   -0.000000      -0.00        1.87         -0.00
 835.00    2/ 3   13150.00      93     8070.00  11540.00     7910.00     -0.00   -0.000000      -0.00        1.97         -0.00
 845.00    1/ 2    1050.00       7     2950.00   7240.00     1040.00     -0.00   -0.000000      -0.00        1.04         -0.00


 POWER    EXHAUST      EXHAUST        CO        CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS          GAS         (WET)       2        (WET)     (WET)       2         X
 RATED      TEMP       PRESSURE      PPMV      (WET)      PPMV      PPMV      (WET)     (WET)
 T.O.    DEGREES F       PSIA                PERCENT V                        PPMV      PPMV

  76       865.00        25.01       20.20      2.02     10.80     58.00      6.50     64.50     -0.00     -0.00      -0.00
  86       910.00        26.54       16.00      2.19      6.50     72.90      8.00     80.90     -0.00     -0.00      -0.00
  93       950.00        27.93       14.00      2.44      3.90     90.60      9.00     99.60     -0.00     -0.00      -0.00
   7       620.00        14.98      107.00      0.51     49.70      0.70      5.00      5.70     -0.00     -0.00      -0.00


 POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  76       2.01      0.61      1.06   3151.05      9.46     10.52     12.59      3.86      6.66  19788.61     59.40     66.06
  86       1.47      0.34      1.20   3152.65     10.97     12.17     10.42      2.43      8.56  22415.35     78.00     86.56
  93       1.15      0.18      1.22   3153.58     12.24     13.46      9.11      1.45      9.62  24744.78     96.83    106.45
   7      40.88     10.88      3.14   3061.81      0.44      3.58     42.52     11.31      3.26   3184.28      0.46      3.72


 POWER          CO                CO               THC               NO               NO               NO
PERCENT                            2                                                   2                X
 RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

  76          1.168          1835.678            0.358             5.510            0.618            6.128
  86          0.864          1858.653            0.201             6.468            0.710            7.178
  93          0.693          1896.941            0.111             7.363            0.731            8.095
   7         40.495          3032.653           10.772             0.435            3.108            3.543
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    CAL ID NUMBER:  346   ENGINE TYPE AND MODEL: JT8D-7                SERIAL NUMBER:  654992

TEST ORGANIZATION:  U.S. BUREAU OF MINES


   MODE    FRACTIONAL     POWER   EMISSION    FUEL       USAGE     TIME IN      CO        FUEL     LB CO /    ENERGY    LB CO /
             POWER        # TH      RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060        840.0    34.100    822.701     1.000      19.00     10.798     260.52     41.448    266.00    0.04059
TAKEOFF     1.000      14000.0     8.258   8522.590     1.000       0.70      0.096      99.43      0.969    163.33    0.00059
CLIMBOUT    0.850      11900.0    11.486   7158.480     1.000       2.20      0.421     262.48      1.605    436.33    0.00097
APPROACH    0.400       5600.0    30.095   3379.055     1.000       4.00      2.006     225.27      8.906    373.33    0.00537
TAXI-IDLE   0.060        840.0    34.100    822.701     1.000       7.00      3.978      95.98     41.448     98.00    0.04059

                                TOTAL FOR CYCLE:                            17.300     943.68              1337.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:             18.333
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:            12.940
                                LBS POLLUTANT/1000K LB TH AT T.O.:           0.688


   MODE    FRACTIONAL     POWER   EMISSION    FUEL       USAGE     TIME IN      HC        FUEL     LB HC /    ENERGY    LB HC /
             POWER        # TH      RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060        840.0    10.388    822.701     1.000      19.00      3.290     260.52     12.627    266.00    0.01237
TAKEOFF     1.000      14000.0     0.508   8522.590     1.000       0.70      0.006      99.43      0.060    163.33    0.00004
CLIMBOUT    0.850      11900.0     3.000   7158.480     1.000       2.20      0.110     262.48      0.419    436.33    0.00025
APPROACH    0.400       5600.0     6.594   3379.055     1.000       4.00      0.440     225.27      1.952    373.33    0.00118
TAXI-IDLE   0.060        840.0    10.388    822.701     1.000       7.00      1.212      95.98     12.627     98.00    0.01237

                                TOTAL FOR CYCLE:                             5.057     943.68              1337.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:              5.359
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:             3.782
                                LBS POLLUTANT/1000K LB TH AT T.O.:           0.423


   MODE    FRACTIONAL     POWER   EMISSION    FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/    ENERGY    LB NOX/
             POWER        # TH      RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060        840.0     2.816    822.701     1.000      19.00      0.892     260.52      3.423    266.00    0.00335
TAKEOFF     1.000      14000.0   125.935   8522.590     1.000       0.70      1.469      99.43     14.777    163.33    0.00900
CLIMBOUT    0.850      11900.0    86.415   7158.480     1.000       2.20      3.169     262.48     12.072    436.33    0.00726
APPROACH    0.400       5600.0    24.617   3379.055     1.000       4.00      1.641     225.27      7.285    373.33    0.00440
TAXI-IDLE   0.060        840.0     2.816    822.701     1.000       7.00      0.329      95.98      3.423     98.00    0.00335

                                TOTAL FOR CYCLE:                             7.499     943.68              1337.00
                                LBS POLLUTANT/1K LB FUEL/CYCLE:              7.947
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:             5.609
                                LBS POLLUTANT/1000K LB TH AT T.O.:         104.946
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DATE:   6/23/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:   63    ENGINE TYPE AND MODEL:  JT8D                          SERIAL NUMBER:    X-370-47A

                            RATED THRUST:         15500.

     ENGINE TOTAL TIME:                                  -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        -0. HRS
          N2 COMPRESSOR OVERHAUL:                        -0. HRS
          COMBUSTOR CAN REPLACEMENT:                     -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        -0. HRS
          N1 TURBINE OVERHAUL:                           -0. HRS
          N2 TURBINE OVERHAUL:                           -0. HRS

     FUEL: JP-4C               FUEL H/C RATIO:   2.000

 OPERATIONAL DATA ***************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   79.99   FINISH   78.25

     ATMOSPHERIC PRESSURE:              START   29.88   FINISH   29.86

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.1400

     RELATIVE HUMIDITY:                      81.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:  10

 COMMENTS:

  BURNER = 409-H


  CLOCK      TEST          POWER                     ENGINE             MEASURED    GAS GEN      CALC      COMPRESSOR    ENGINE       TURBINE
  TIME       MODE    THRUST,LBS  PERCENT             SPEED                FUEL      AIR FLOW      F/A      DISCHARGE    PRESSURE       INLET
                         OR        RATED              RPM                 FLOW       LB/SEC                   TEMP        RATIO         TEMP
                        SHP        T.O.          N1          N2          LB/HR                            DEGREES F      EPR       DEGREES F

 1010.00     1/ 0      792.00        5      2625.00     6515.00      950.00      30.10    0.008700      248.00        1.04       1001.00
 1023.00     2/ 1     1857.00       11      3810.00     8160.00     1519.00      43.49    0.009710      359.50        1.10       1128.00
 1032.00     3/ 2     6015.00       38      6040.00     9935.00     3452.50      87.45    0.010970      578.20        1.35       1340.00
 1043.00     4/ 3     9982.00       64      7145.00    10720.00     5644.00     116.95    0.013410      696.50        1.64       1405.00
 1102.00     5/ 4    13033.00       84      7800.00    11180.00     7563.00     138.30    0.015200      772.30        1.90       1770.00
 1111.00     6/ 5    15581.00      100      8435.00    11590.00     9374.50     155.78    0.016810      843.80        2.12       1922.00
 1120.00     7/ 6    12055.00       77      7580.00    11055.00     6825.50     129.13    0.014690      749.30        1.80       1720.00
 1130.00     8/ 7     6973.00       44      6365.00    10185.00     3981.50     103.30    0.010710      615.80        1.42       1360.00
 1138.00     9/ 8     4981.00       32      5620.00     9655.00     2927.00      77.40    0.010510      539.20        1.28       1275.00
 1150.00    10/ 9     1283.00        8      3175.00     7400.00     1155.00      35.14    0.009140      309.70        1.06       1038.00


  POWER    EXHAUST      EXHAUST          CO           CO         THC         NO          NO          NO       ALDEHYDES    SMOKE    PARTICULATES
 PERCENT     GAS          GAS          (WET)           2        (WET)      (WET)          2           X
  RATED      TEMP       PRESSURE        PPMV        (WET)        PPMV       PPMV        (WET)       (WET)
  T.O.    DEGREES F       PSIA                    PERCENT V                             PPMV        PPMV

    5      780.00        15.20        229.20        1.09       84.80        9.20        3.40       12.60       -0.00       -0.00       -0.00
   11      774.40        15.98        114.50        1.30       23.60       15.40        5.00       20.40       -0.00       -0.00       -0.00
   38      763.10        19.59         42.60        1.60        6.20       39.30        5.50       44.80       -0.00       -0.00       -0.00
   64      890.60        23.73         18.30        2.06        7.10       86.90        5.80       92.70       -0.00       -0.00       -0.00
   84      989.40        27.43         43.90        2.31        4.40      139.70        8.30      148.00       -0.00       -0.00       -0.00
  100     1086.00        30.55         35.80        2.64        4.20      209.30       10.50      219.80       -0.00       -0.00       -0.00
   77      965.10        25.97         49.30        2.14        4.50      119.20        8.30      127.50       -0.00       -0.00       -0.00
   44      803.80        20.56         59.60        1.53        6.50       49.10        7.50       56.60       -0.00       -0.00       -0.00
   32      735.00        18.66        116.70        1.29        9.50       29.80        8.20       38.00       -0.00       -0.00       -0.00
    8      764.40        15.49        142.20        0.95       35.10       10.20        7.10       17.30       -0.00       -0.00       -0.00


  POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2         NO         NOX        CO          HC         NO2        CO2         NO        NOX
  RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    5       40.82       8.65       0.99     3049.89       2.69       3.69      38.78       8.22       0.94     2897.39       2.56       3.50
   11       17.40       2.05       1.25     3104.77       3.84       5.09      26.44       3.12       1.90     4716.13       5.84       7.74
   38        5.30       0.44       1.12     3128.21       8.03       9.16      18.30       1.53       3.88    10800.13      27.73      31.61
   64        1.77       0.39       0.92     3133.88      13.82      14.74      10.00       2.22       5.21    17687.61      78.00      83.21
   84        3.79       0.22       1.18     3131.20      19.80      20.97      28.64       1.64       8.90    23681.24     149.72     158.61
  100        2.70       0.18       1.30     3133.00      25.97      27.27      25.35       1.70      12.21    29370.29     243.47     255.63
   77        4.59       0.24       1.27     3129.88      18.23      19.49      31.32       1.64       8.66    21362.96     124.40     133.06
   44        7.75       0.48       1.60     3124.25      10.48      12.08      30.84       1.93       6.37    12439.20      41.73      48.11
   32       17.89       0.83       2.06     3107.35       7.50       9.57      52.37       2.44       6.04     9095.20      21.96      28.01
    8       29.34       4.15       2.41     3080.26       3.46       5.86      33.89       4.79       2.78     3557.70       3.99       6.77


  POWER         CO                 CO                  THC                 NO                  NO                  NO
 PERCENT                            2                                                           2                   X
  RATED     LB/1K#TH-HR        LB/1K#TH-HR         LB/1K#TH-HR        LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR
  T.O.

    5         48.959            3658.325             10.374               3.228               1.193               4.421
   11         14.236            2539.652              1.681               3.145               1.021               4.166
   38          3.043            1795.532              0.254               4.610               0.645               5.256
   64          1.002            1771.951              0.223               7.814               0.522               8.336
   84          2.198            1817.021              0.126              11.488               0.683              12.170
  100          1.627            1885.007              0.109              15.623               0.784              16.407
   77          2.598            1772.125              0.136              10.319               0.719              11.038
   44          4.423            1783.909              0.276               5.985               0.914               6.899
   32         10.513            1825.979              0.490               4.410               1.213               5.623
    8         26.417            2772.953              3.735               3.112               2.167               5.279
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     CAL ID NUMBER:   63   ENGINE TYPE AND MODEL: JT8D                    SERIAL NUMBER:   X-370-47A

TEST ORGANIZATION:  PRATT & WHITNEY


   MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      CO        FUEL     LB CO /    ENERGY   LB CO /
              POWER      # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060        930.0    38.597    966.115     1.000      19.00     12.222     305.94    39.951     294.50    0.04150
TAKEOFF     1.000      15500.0    20.127   9485.969     1.000       0.70      0.235     110.67     2.122     180.83    0.00130
CLIMBOUT    0.850      13175.0    20.335   7814.688     1.000       2.20      0.746     286.54     2.602     483.08    0.00154
APPROACH    0.400       6200.0    32.719   3672.174     1.000       4.00      2.181     244.81     8.910     413.33    0.00528
TAXI-IDLE   0.060        930.0    38.597    966.115     1.000       7.00      4.503     112.71    39.951     108.50    0.04150

                                 TOTAL FOR CYCLE:                            19.887    1060.67              1480.25
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             18.750
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            13.435
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           1.515


   MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      HC        FUEL     LB HC /    ENERGY   LB HC /
              POWER      # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060        930.0     6.769    966.115     1.000      19.00      2.144     305.94     7.007     294.50    0.00728
TAKEOFF     1.000      15500.0     2.017   9485.969     1.000       0.70      0.024     110.67     0.213     180.83    0.00013
CLIMBOUT    0.850      13175.0     1.920   7814.688     1.000       2.20      0.070     286.54     0.246     483.08    0.00015
APPROACH    0.400       6200.0     2.530   3672.174     1.000       4.00      0.169     244.81     0.689     413.33    0.00041
TAXI-IDLE   0.060        930.0     6.769    966.115     1.000       7.00      0.790     112.71     7.007     108.50    0.00728

                                 TOTAL FOR CYCLE:                             3.196    1060.67              1480.25
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              3.013
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             2.159
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           1.519


   MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      NOX       FUEL     LB NOX/    ENERGY   LB NOX/
              POWER      # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060        930.0     3.995    966.115     1.000      19.00      1.265     305.94     4.135     294.50    0.00430
TAKEOFF     1.000      15500.0   261.961   9485.969     1.000       0.70      3.056     110.67    27.616     180.83    0.01690
CLIMBOUT    0.850      13175.0   161.697   7814.688     1.000       2.20      5.929     286.54    20.691     483.08    0.01227
APPROACH    0.400       6200.0    37.345   3672.174     1.000       4.00      2.490     244.81    10.170     413.33    0.00602
TAXI-IDLE   0.060        930.0     3.995    966.115     1.000       7.00      0.466     112.71     4.135     108.50    0.00430

                                 TOTAL FOR CYCLE:                            13.206    1060.67              1480.25
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             12.450
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             8.921
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         197.175
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DATE:   6/23/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:  150    ENGINE TYPE AND MODEL:  JT8D                  SERIAL NUMBER:    X-370-478

                           RATED THRUST:        15500.

     ENGINE TOTAL TIME:                                   -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         -0. HRS
          N2 COMPRESSOR OVERHAUL:                         -0. HRS
          COMBUSTOR CAN REPLACEMENT:                      -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         -0. HRS
          N1 TURBINE OVERHAUL:                            -0. HRS
          N2 TURBINE OVERHAUL:                            -0. HRS

     FUEL: JP-4C                FUEL H/C RATIO:   2.000

OPERATIONAL DATA ****************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   83.29   FINISH   83.29

     ATMOSPHERIC PRESSURE:              START   29.82   FINISH   29.80

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0108

     RELATIVE HUMIDITY:                       42.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   15.00,  FLOW RATE, LITERS/MIN:    2.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:  10

COMMENTS:

 BURNER = 409-H


  CLOCK      TEST          POWER               ENGINE             MEASURED    GAS GEN      CALC      COMPRESSOR     ENGINE       TURBINE
  TIME       MODE    THRUST,LBS  PERCENT       SPEED                FUEL     AIR FLOW      F/A      DISCHARGE     PRESSURE      INLET
                         OR       RATED         RPM                 FLOW      LB/SEC                   TEMP         RATIO        TEMP
                        SHP       T.O.     N1          N2          LB/HR                            DEGREES F       EPR       DEGREES F

 1341.00     1/ 0      790.00       5    2655.00     6685.00      966.00      29.70    0.009040      244.80         1.04       1001.00
 1353.00     2/ 1     1782.00      11    3765.00     8130.00     1486.00      41.10    0.009530      366.00         1.10       1128.00
 1409.00     3/ 2     6063.00      39    5595.00    10005.00     3502.50      87.20    0.011170      593.00         1.35       1340.00
 1451.00     4/ 3     9563.00      64    7190.00    10800.00     5622.50     114.50    0.013651      720.70         1.64       1405.00
 1508.00     5/ 4    13048.00      84    7845.00    11255.00     7556.00     135.20    0.015536      792.00         1.90       1770.00
 1513.00     6/ 5    15592.00     100    8515.00    11685.00     9593.00     153.70    0.017350      870.20         2.12       1922.00
 1523.00     7/ 6    12072.00      77    7625.00    11170.00     6932.50     129.00    0.014940      768.80         1.80       1720.00
 1530.00     8/ 7     6976.00      45    6404.00    10240.00     3985.00      93.90    0.011790      630.80         1.42       1360.00
 1554.00     9/ 8     4931.00      31    5652.00     9716.00     2916.50      77.50    0.010460      554.00         1.28       1275.00
 1613.00    10/ 9     1353.00       8    3269.00     7547.00     1188.00      36.10    0.009150      523.50         1.06       1038.00


  POWER    EXHAUST     EXHAUST          CO          CO        THC       NO         NO          NO       ALDEHYDES    SMOKE    PARTICULATES
 PERCENT     GAS         GAS          (WET)          2       (WET)     (WET)        2           X
  RATED     TEMP       PRESSURE        PPMV        (WET)      PPMV      PPMV      (WET)       (WET)
  T.O.   DEGREES F       PSIA                    PERCENT V                         PPMV        PPMV

    5      780.00       15.20        211.30        1.09      68.50      7.00       4.50       11.50      -0.00       -0.00       -0.00
   11      774.40       15.98        105.80        1.28      17.90     14.90       7.10       22.00      -0.00       -0.00       -0.00
   39      763.10       19.59         68.40        1.64       7.80     44.00       8.20       52.20      -0.00       -0.00       -0.00
   64      890.60       23.73         16.30        2.26       8.30     96.40       7.40      103.80      -0.00       -0.00       -0.00
   84      989.40       27.43         10.60        2.66       7.00    163.30       9.40      172.70      -0.00       -0.00       -0.00
  100     1086.00       30.55          8.60        3.07       6.30    241.60      13.10      254.70      -0.00       -0.00       -0.00
   77      965.10       25.97         11.70        2.51       6.20    142.90      10.00      152.90      -0.00       -0.00       -0.00
   45      803.80       20.56         27.50        1.67       7.20     53.80       8.60       62.40      -0.00       -0.00       -0.00
   31      735.00       18.66         49.20        1.46       9.10     34.10      10.10       44.20      -0.00       -0.00       -0.00
    8      764.40       31.67        132.00        1.14      28.80     14.50       8.20       22.70      -0.00       -0.00       -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    5       37.74      7.01      1.32   3059.22      2.05      3.37     36.46      6.77      1.28   2955.20      1.98      3.26
   11       16.35      1.58      1.80   3107.72      3.78      5.58     24.33      2.36      2.68   4624.28      5.63      8.31
   39        8.29      0.54      1.63   3123.23      8.76     10.39     29.04      1.90      5.72  10939.12     30.68     36.40
   64        1.44      0.42      1.07   3134.33     13.98     15.05      8.09      2.36      6.03  17622.78     78.58     84.61
   84        0.80      0.30      1.16   3135.67     20.12     21.28      6.01      2.27      8.75  23693.12    152.06    160.81
  100        0.56      0.23      1.40   3136.22     25.80     27.20      5.36      2.25     13.42  30085.78    247.52    260.94
   77        0.93      0.28      1.31   3135.51     18.66     19.97      6.45      1.96      9.05  21736.91    129.37    138.42
   45        3.28      0.49      1.69   3131.24     10.55     12.23     13.08      1.96      6.72  12477.99     42.02     48.74
   31        6.70      0.71      2.26   3125.27      7.63      9.89     19.55      2.07      6.59   9114.94     22.26     28.85
    8       22.80      2.85      2.33   3094.10      4.11      6.44     27.09      3.38      2.76   3675.79      4.89      7.65


  POWER          CO                CO                THC               NO                NO                NO
 PERCENT                            2                                                      2                 X
  RATED     LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR
  T.O.

    5          46.152          3740.765             8.569             2.511             1.614             4.126
   11          13.651          2594.996             1.323             3.158             1.505             4.663
   39           4.789          1804.242             0.313             5.060             0.943             6.003
   64           0.812          1768.823             0.237             7.887             0.605             8.493
   84           0.461          1815.843             0.174            11.654             0.671            12.325
  100           0.344          1929.565             0.144            15.875             0.861            16.735
   77           0.534          1800.606             0.152            10.717             0.750            11.467
   45           1.875          1788.703             0.281             6.024             0.963             6.987
   31           3.964          1848.477             0.420             4.513             1.332             5.850
    8          20.021          2716.774             2.502             3.612             2.043             5.655
    CAL ID NUMBER:  150   ENGINE TYPE AND MODEL: JT8D                    SERIAL NUMBER:   X-370-478

TEST ORGANIZATION:  PRATT & WHITNEY


  MODE     FRACTIONAL    POWER    EMISSION     FUEL        USAGE     TIME IN       CO          FUEL     LB CO /     ENERGY    LB CO /
             POWER       # TH       RATE       RATE      WT FACTOR     MODE       MASS         MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                    MIN.       LBS.         LBS.

TAXI-IDLE   0.060       930.0    39.756     962.141     1.000       19.00     12.589       304.68     41.320     294.50     0.04275
TAKEOFF     1.000     15500.0     5.581    9178.480     1.000        0.70      0.065       107.08      0.608     180.83     0.00036
CLIMBOUT    0.850     13175.0     5.952    7656.805     1.000        2.20      0.255       280.75      0.908     483.08     0.00053
APPROACH    0.400      6200.0    18.183    3631.703     1.000        4.00      1.212       242.11      5.007     413.33     0.00293
TAXI-IDLE   0.060       930.0    39.756     962.141     1.000        7.00      4.638       112.25     41.320     108.50     0.04275

                                 TOTAL FOR CYCLE:                            18.760      1046.87                1480.25
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             17.920
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            12.673
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           0.420


  MODE     FRACTIONAL    POWER    EMISSION     FUEL        USAGE     TIME IN       HC          FUEL     LB HC /     ENERGY    LB HC /
             POWER       # TH       RATE       RATE      WT FACTOR     MODE       MASS         MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                    MIN.       LBS.         LBS.

TAXI-IDLE   0.060       930.0     5.179     962.141     1.000       19.00      1.640       304.68      5.383     294.50     0.00557
TAKEOFF     1.000     15500.0     2.326    9178.480     1.000        0.70      0.027       107.08      0.253     180.83     0.00015
CLIMBOUT    0.850     13175.0     2.053    7656.805     1.000        2.20      0.075       280.75      0.268     483.08     0.00016
APPROACH    0.400      6200.0     2.171    3631.703     1.000        4.00      0.145       242.11      0.598     413.33     0.00035
TAXI-IDLE   0.060       930.0     5.179     962.141     1.000        7.00      0.604       112.25      5.383     108.50     0.00557

                                 TOTAL FOR CYCLE:                             2.491      1046.87                1480.25
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              2.380
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             1.683
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           1.751


  MODE     FRACTIONAL    POWER    EMISSION     FUEL        USAGE     TIME IN      NOX          FUEL     LB NOX/     ENERGY    LB NOX/
             POWER       # TH       RATE       RATE      WT FACTOR     MODE       MASS         MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                    MIN.       LBS.         LBS.

TAXI-IDLE   0.060       930.0     4.214     962.141     1.000       19.00      1.335       304.68      4.380     294.50     0.00453
TAKEOFF     1.000     15500.0   252.277    9178.480     1.000        0.70      2.943       107.08     27.486     180.83     0.01628
CLIMBOUT    0.850     13175.0   166.615    7656.805     1.000        2.20      6.109       280.75     21.760     483.08     0.01265
APPROACH    0.400      6200.0    37.315    3631.703     1.000        4.00      2.488       242.11     10.275     413.33     0.00602
TAXI-IDLE   0.060       930.0     4.214     962.141     1.000        7.00      0.492       112.25      4.380     108.50     0.00453

                                 TOTAL FOR CYCLE:                            13.366      1046.87                1480.25
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             12.768
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             9.030
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         189.886
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DATE: 6/23/71

TEST ORGANIZATION: PRATT & WHITNEY

ENGINE SUPPLIER: PRATT AND WHITNEY

ENGINE DATA **

CAL ID NUMBER: 151 ENGINE TYPE AND MODEL: JT8D SERIAL NUMBER: X-370-470

RATED THRUST: 15500.

ENGINE TOTAL TIME: -0. HRS

TIME SINCE HOT SECTION OVERHAUL: -0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: -0. HRS
N2 COMPRESSOR OVERHAUL: -0. HRS
COMBUSTOR CAN REPLACEMENT: -0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: -0. HRS
N1 TURBINE OVERHAUL: -0. HRS
N2 TURBINE OVERHAUL: -0. HRS

FUEL: JP-5 FUEL H/C RATIO: 1.970

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 81.41 FINISH 77.48

ATMOSPHERIC PRESSURE: START 29.81 FINISH 29.84

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0153

RELATIVE HUMIDITY: 65.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 2.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 10

COMMENTS:

BURNER = 409 H

CLOCK TIME	TEST MODE	POWER THRUST, LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1802.00	1/ 0	791.00	5	2638.00	6679.00	970.00	29.70	0.009080	261.30	1.04	991.90
1821.00	2/ 1	1825.00	11	2815.00	8194.00	1539.00	43.18	0.009910	369.30	1.10	1133.20
1833.00	3/ 2	5991.00	38	6045.00	9973.00	3485.50	86.18	0.011240	588.30	1.35	1349.50
1852.00	4/ 3	9990.00	64	7177.00	10772.00	5779.00	115.54	0.013920	708.70	1.63	1611.40
1910.00	5/ 4	13001.00	83	7807.00	11208.00	7656.50	136.22	0.015640	778.30	1.89	1774.50
1916.00	6/ 5	15579.00	100	8472.00	11627.00	9650.50	154.92	0.017318	856.70	2.13	1941.90
1930.00	7/ 6	12023.00	77	7581.00	11056.00	6986.00	129.26	0.015025	755.80	1.80	1719.20
1933.00	8/ 7	6932.00	44	6355.00	10182.00	4012.50	94.31	0.011828	618.00	1.42	1410.90
1950.00	9/ 8	4963.00	32	5632.00	9677.00	2981.00	78.00	0.010620	543.30	1.29	1270.10
2008.00	10/ 9	1174.00	7	3067.00	7252.00	1136.00	34.07	0.009270	295.70	1.06	1011.60

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO 2 (WET) PPMV	NO X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
5	789.40	15.21	285.00	1.20	60.10	6.10	7.80	13.90	-0.00	-0.00	-0.00
11	785.00	16.00	125.60	1.42	24.60	12.40	7.00	19.40	-0.00	-0.00	-0.00
38	780.60	19.55	46.90	1.74	8.50	35.80	7.40	43.20	-0.00	-0.00	-0.00
64	910.60	23.59	19.60	2.44	5.30	84.30	7.30	91.60	-0.00	-0.00	-0.00
83	1002.50	27.25	12.20	2.93	4.00	144.30	9.10	153.40	-0.00	-0.00	-0.00
100	1100.00	30.61	9.50	3.36	3.90	225.90	11.80	237.70	-0.00	-0.00	-0.00
77	975.60	26.03	14.00	2.79	3.60	120.60	9.00	129.60	-0.00	-0.00	-0.00
44	808.70	20.53	37.70	1.88	5.70	54.00	7.70	61.70	-0.00	-0.00	-0.00
32	741.90	18.67	62.40	1.56	9.00	28.00	8.80	36.80	-0.00	-0.00	-0.00
7	760.60	15.46	174.00	1.23	52.50	9.00	6.00	15.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
5	46.70	5.58	2.08	3056.62	1.62	3.70	44.82	5.41	2.01	2964.93	1.58	3.59
11	17.52	1.96	1.60	3111.61	2.84	4.44	26.96	3.02	2.47	4788.77	4.37	6.84
38	5.39	0.56	1.39	3134.55	6.74	8.14	18.74	1.95	4.86	10925.46	23.50	28.36
64	1.61	0.25	0.98	3141.32	11.35	12.33	9.29	1.44	5.68	18153.68	65.57	71.24
83	0.83	0.16	1.02	3142.79	16.18	17.20	6.38	1.20	7.81	24062.74	123.89	131.70
100	0.57	0.13	1.15	3143.27	22.09	23.25	5.46	1.28	11.14	30334.14	213.20	224.34
77	1.00	0.15	1.05	3142.54	14.20	15.26	7.01	1.03	7.40	21953.79	99.21	106.61
44	4.00	0.35	1.34	3137.28	9.42	10.76	16.07	1.39	5.39	12588.34	37.80	43.19
32	7.97	0.66	1.85	3130.20	5.87	7.72	23.76	1.96	5.50	9331.12	17.51	23.01
7	28.43	4.80	1.57	3086.68	2.36	3.94	32.30	5.46	1.79	3506.47	2.68	4.47

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO 2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO 2 LB/1K#TH-HR	NO X LB/1K#TH-HR
5	56.458	3748.325	6.843	1.992	2.547	4.539
11	14.771	2623.983	1.657	2.395	1.352	3.748
38	3.128	1823.645	0.325	3.922	0.811	4.733
64	0.929	1817.185	0.144	6.563	0.568	7.132
83	0.490	1850.838	0.092	9.529	0.601	10.130
100	0.350	1947.118	0.082	13.685	0.715	14.400
77	0.583	1825.982	0.086	8.251	0.616	8.867
44	2.318	1815.975	0.201	5.453	0.778	6.230
32	4.786	1880.137	0.395	3.528	1.109	4.637
7	27.509	2986.773	4.647	2.285	1.523	3.808

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     CAL ID NUMBER:  151   ENGINE TYPE AND MODEL: JT8D                  SERIAL NUMBER:   X-370-47C

TEST ORGANIZATION:  PRATT & WHITNEY

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     CO        FUEL     LB CO /     ENERGY   LB CO /
             POWER      # TH       RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060       930.0    60.595   1050.830     1.000       19.00    19.188     332.76     57.664     294.50    0.06516
TAKEOFF     1.000     15500.0     8.049   9618.285     1.000        0.70     0.094     112.21      0.837     180.83    0.00052
CLIMBOUT    0.850     13175.0    10.278   7902.832     1.000        2.20     0.377     289.77      1.301     483.08    0.00078
APPROACH    0.400      6200.0    21.374   3810.882     1.000        4.00     1.425     254.06      5.609     413.33    0.00345
TAXI-IDLE   0.060       930.0    60.595   1050.830     1.000        7.00     7.069     122.60     57.664     108.50    0.06516

                             TOTAL FOR CYCLE:                               28.153    1111.40                1480.25
                             LBS POLLUTANT/1K LB FUEL/CYCLE:                25.331
                             LBS POLLUTANT/1K LB TH-HR/CYCLE:               19.019
                             LBS POLLUTANT/1000K LB TH AT T.O.:              0.606


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     HC        FUEL     LB HC /     ENERGY   LB HC /
             POWER      # TH       RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060       930.0     5.869   1050.830     1.000       19.00     1.858     332.76      5.585     294.50    0.00631
TAKEOFF     1.000     15500.0     1.500   9618.285     1.000        0.70     0.018     112.21      0.156     180.83    0.00010
CLIMBOUT    0.850     13175.0     1.233   7902.832     1.000        2.20     0.045     289.77      0.156     483.08    0.00009
APPROACH    0.400      6200.0     2.256   3810.882     1.000        4.00     0.150     254.06      0.592     413.33    0.00036
TAXI-IDLE   0.060       930.0     5.869   1050.830     1.000        7.00     0.685     122.60      5.585     108.50    0.00631

                             TOTAL FOR CYCLE:                                2.756    1111.40                1480.25
                             LBS POLLUTANT/1K LB FUEL/CYCLE:                 2.480
                             LBS POLLUTANT/1K LB TH-HR/CYCLE:                1.862
                             LBS POLLUTANT/1000K LB TH AT T.O.:              1.129


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX       FUEL     LB NOX/     ENERGY   LB NOX/
             POWER      # TH       RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060       930.0     3.287   1050.830     1.000       19.00     1.041     332.76      3.128     294.50    0.00353
TAKEOFF     1.000     15500.0   224.084   9618.285     1.000        0.70     2.614     112.21     23.298     180.83    0.01446
CLIMBOUT    0.850     13175.0   137.551   7902.832     1.000        2.20     5.044     289.77     17.405     483.08    0.01044
APPROACH    0.400      6200.0    32.194   3810.882     1.000        4.00     2.146     254.06      8.448     413.33    0.00519
TAXI-IDLE   0.060       930.0     3.287   1050.830     1.000        7.00     0.383     122.60      3.128     108.50    0.00353

                             TOTAL FOR CYCLE:                               11.228    1111.40                1480.25
                             LBS POLLUTANT/1K LB FUEL/CYCLE:                10.103
                             LBS POLLUTANT/1K LB TH-HR/CYCLE:                7.586
                             LBS POLLUTANT/1000K LB TH AT T.O.:            168.665
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DATE:   6/24/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ************************************************************************************************

    CAL ID NUMBER:  152    ENGINE TYPE AND MODEL:  JT8D                          SERIAL NUMBER:   X-370-470

                           RATED THRUST:        15500.

    ENGINE TOTAL TIME:                                      -0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                        -0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                            -0. HRS
         N2 COMPRESSOR OVERHAUL:                            -0. HRS
         COMBUSTOR CAN REPLACEMENT:                         -0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:            -0. HRS
         N1 TURBINE OVERHAUL:                               -0. HRS
         N2 TURBINE OVERHAUL:                               -0. HRS

    FUEL: JP-5                  FUEL H/C RATIO:   1.970

OPERATIONAL DATA ***********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   75.45   FINISH   86.66

     ATMOSPHERIC PRESSURE:              START   29.86   FINISH   29.81

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0152

     RELATIVE HUMIDITY:                    75.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

  NUMBER OF TESTS:   4

  COMMENTS:

   BURNER = 409 H


  CLOCK      TEST          POWER                    ENGINE          MEASURED   GAS GEN     CALC    COMPRESSOR    ENGINE     TURBINE
  TIME       MODE    THRUST,LBS  PERCENT            SPEED             FUEL    AIR FLOW     F/A     DISCHARGE   PRESSURE     INLET
                         OR        RATED             RPM              FLOW     LB/SEC                 TEMP        RATIO       TEMP
                        SHP        T.O.        N1          N2        LB/HR                        DEGREES F       EPR     DEGREES F

   952.00    1/ 0     4993.00       32      5560.00     9670.00    2981.50     78.60   0.010540    537.00        1.29      1259.80
  1123.00    2/ 1    14510.00       93      9200.00    11465.00    8792.00    147.51   0.016560    825.80        2.03      1871.60
  1320.00    3/ 2    12686.00       81      7785.00    11225.00    7462.50    139.37   0.014670    619.50        1.88      1590.70
  1433.00    4/ 3     1374.00        8      3305.00     7595.00    1390.00     35.98   0.010730    328.80        1.08      1074.50


   POWER     EXHAUST      EXHAUST       CO        CO       THC      NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
  PERCENT      GAS          GAS       (WET)        2      (WET)   (WET)       2         X
   RATED      TEMP       PRESSURE      PPMV     (WET)     PPMV    PPMV     (WET)     (WET)
   T.O.     DEGREES F      PSIA               PERCENT V                    PPMV      PPMV

    32        737.80       18.71       59.90      3.55     9.40    25.60     6.10     31.70     -0.00      -0.00      -0.00
    93       1058.00       29.22       10.30      2.74     5.80   178.90     9.50    188.40     -0.00      -0.00      -0.00
    81       1013.10       27.06       13.20      2.88     5.90   147.10     7.50    154.60     -0.00      -0.00      -0.00
     8        785.90       15.81      151.40      0.59    35.70     7.90    10.60     18.50     -0.00      -0.00      -0.00


   POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
   RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    32        3.37      0.30      1.56   3133.40      2.37      2.93     10.05      0.90      1.68   9357.13      7.05      8.73
    93        0.75      0.24      1.14   3142.58     21.45     22.59      6.61      2.13     10.01  27630.41    188.59    198.61
    81        0.92      0.23      0.86   3142.44     16.78     17.63      6.94      1.75      6.38  23450.45    125.21    131.60
     8       49.79      6.72      5.72   3047.97      4.27      4.99     69.19      9.34      7.96   4236.54      5.93     13.89


   POWER          CO              CO             THC              NO              NO              NO
  PERCENT                          2                                               2               X
   RATED     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR
   T.O.

    32          2.013        1874.051          0.181           1.413           0.337           1.749
    93          0.456        1904.232          0.147          12.998           0.690          13.689
    81          0.539        1844.530          0.138           9.870           0.503          10.374
     8         50.357        3083.360          6.891           4.316           5.791          10.107
    CAL ID NUMBER:  152   ENGINE TYPE AND MODEL: JT8D                SERIAL NUMBER:   X-370-47D

TEST ORGANIZATION:  PRATT & WHITNEY

   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY    LB CO /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE    0.060       930.0   102.156   1098.224     1.000       19.00     32.349     347.77     93.019     294.50    0.10985
TAKEOFF      1.000     15500.0     7.318   9470.844     1.000        0.70      0.085     110.49      0.773     180.83    0.00047
CLIMBOUT     0.850     13175.0     7.467   7812.359     1.000        2.20      0.274     286.45      0.956     483.08    0.00057
APPROACH     0.400      6200.0    11.633   3713.650     1.000        4.00      0.776     247.58      3.132     413.33    0.00188
TAXI-IDLE    0.060       930.0   102.156   1098.224     1.000        7.00     11.918     128.13     93.019     108.50    0.10985

                                 TOTAL FOR CYCLE:                              45.402    1120.42                1480.25
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               40.523
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              30.672
                                 LBS POLLUTANT/1000K LB TH AT T.O.:             0.551


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY    LB HC /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE    0.060       930.0    17.517   1098.224     1.000       19.00      5.547     347.77     15.950     294.50    0.01884
TAKEOFF      1.000     15500.0     2.394   9470.844     1.000        0.70      0.028     110.49      0.253     180.83    0.00015
CLIMBOUT     0.850     13175.0     2.057   7812.359     1.000        2.20      0.075     286.45      0.263     483.08    0.00016
APPROACH     0.400      6200.0     1.399   3713.650     1.000        4.00      0.093     247.58      0.377     413.33    0.00023
TAXI-IDLE    0.060       930.0    17.517   1098.224     1.000        7.00      2.044     128.13     15.950     108.50    0.01884

                                 TOTAL FOR CYCLE:                               7.787    1120.42                1480.25
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:                6.950
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:               5.261
                                 LBS POLLUTANT/1000K LB TH AT T.O.:             1.802


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      NOX       FUEL     LB NOX/     ENERGY    LB NOX/
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE    0.060       930.0     0.689   1098.224     1.000       19.00      0.218     347.77      0.627     294.50    0.00074
TAKEOFF      1.000     15500.0   239.545   9470.844     1.000        0.70      2.795     110.49     25.293     180.83    0.01545
CLIMBOUT     0.850     13175.0   150.127   7812.359     1.000        2.20      5.505     286.43     19.217     483.08    0.01139
APPROACH     0.400      6200.0    19.373   3713.650     1.000        4.00      1.292     247.58      5.217     413.33    0.00312
TAXI-IDLE    0.060       930.0     0.689   1098.224     1.000        7.00      0.080     128.13      0.627     108.50    0.00074

                                 TOTAL FOR CYCLE:                               9.889    1120.42                1480.25
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:                8.826
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:               6.681
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           180.303
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DATE: 7/14/71

TEST ORGANIZATION: U.S. BUREAU OF MINES

ENGINE SUPPLIER: AMERICAN AIRLINES

ENGINE DATA **

CAL ID NUMBER: 90 ENGINE TYPE AND MODEL: JT8D-1 SERIAL NUMBER: 654458

RATED THRUST: 14000.

ENGINE TOTAL TIME: 8340. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	0. HRS
N2 COMPRESSOR OVERHAUL:	0. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	0. HRS
N1 TURBINE OVERHAUL:	0. HRS
N2 TURBINE OVERHAUL:	0. HRS

FUEL: JET - A FUEL H/C RATIO: 1.920

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 98.00 FINISH 99.00

ATMOSPHERIC PRESSURE: START 14.35 FINISH 14.35

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0130

RELATIVE HUMIDITY: 30.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 134.00, FLOW RATE, LITERS/MIN: 16.00

SAMPLE LINE TRANSPORT TIME, SEC: -0.00

NUMBER OF TESTS: 7

COMMENTS:

H/C IS CAL-ESTIMATED
TEMP. SAMPLELINE AVERAGED
TOP ARM OF PROBE FAILED DURING 2ND LAST RUN
WITH RETROFIT

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1100.00	1/ 0	970.00	6	2948.00	7275.00	1133.00	-0.00	-0.000000	-0.00	1.01	98.00
105.00	6/ 1	8580.00	61	7177.00	11055.00	5190.00	-0.00	-0.000000	-0.00	2.12	98.00
110.00	1/ 6	990.00	7	2965.00	7312.00	1024.00	-0.00	-0.000000	-0.00	1.01	99.00
115.00	4/ 1	10110.00	72	7534.00	11340.00	6150.00	-0.00	-0.000000	-0.00	2.36	99.00
1.20	3/ 4	11130.00	79	7773.00	11548.00	6770.00	-0.00	-0.000000	-0.00	2.54	99.00
125.00	2/ 3	12020.00	85	7984.00	11687.00	7410.00	-0.00	-0.000000	-0.00	2.69	99.00
130.00	1/ 2	980.00	6	2972.00	7327.00	1030.00	-0.00	-0.000000	-0.00	1.01	99.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NC 2 (WET) PPMV	NO X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
6	735.00	15.60	87.00	0.71	24.20	4.10	3.00	7.10	2.71	-0.00	-0.00
61	900.00	30.70	19.50	1.98	2.20	111.00	8.50	119.50	0.26	-0.00	-0.00
7	735.00	15.60	63.00	0.69	23.30	4.60	3.00	7.60	-0.00	-0.00	-0.00
72	940.00	34.40	14.20	1.98	1.70	90.00	9.00	99.00	0.23	-0.00	-0.00
79	990.00	37.10	14.20	2.07	1.60	108.00	10.00	118.00	0.27	-0.00	-0.00
85	1020.00	39.20	19.50	2.19	1.30	130.00	11.00	141.00	0.36	-0.00	-0.00
6	715.00	15.60	91.00	1.00	35.00	8.50	5.00	13.50	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
6	24.23	3.86	1.37	3107.22	1.89	3.25	27.46	4.37	1.56	3520.48	2.13	3.68
61	1.98	0.13	1.41	3152.44	18.48	19.89	10.26	0.66	7.34	16361.14	95.89	103.23
7	23.79	3.83	1.41	3108.01	2.17	3.58	24.37	3.92	1.45	3182.60	2.22	3.66
72	1.84	0.10	1.50	3152.72	14.98	16.48	11.34	0.61	9.21	19389.24	92.13	101.35
79	1.76	0.09	1.59	3152.87	17.20	18.79	11.94	0.60	10.78	21344.95	116.42	127.20
85	1.79	0.07	1.66	3152.90	19.57	21.22	13.24	0.51	12.27	23362.95	144.98	157.25
6	18.05	3.94	1.63	3116.62	2.77	4.40	18.59	4.10	1.68	3210.12	2.85	4.53

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO 2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO 2 LB/1K#TH-HR	NO X LB/1K#TH-HR
6	28.304	3629.363	4.509	2.191	1.603	3.794
61	1.195	1906.893	0.077	11.175	0.856	12.031
7	24.611	3214.744	3.957	2.240	1.461	3.702
72	1.122	1917.928	0.060	9.113	0.911	10.024
79	1.073	1917.796	0.054	10.460	0.969	11.429
85	1.101	1943.673	0.042	12.062	1.021	13.082
6	18.971	3275.630	4.179	2.911	1.712	4.623

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    CAL ID NUMBER:   90   ENGINE TYPE AND MODEL: JT8D-1                SERIAL NUMBER:  654458

TEST ORGANIZATION:  U.S. BUREAU OF MINES

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN      CO        FUEL     LB CO /     ENERGY    LB CO /
            POWER       # TH       RATE       RATE     WT FACTOR     MODE       MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.       LBS.       LBS.

TAXI-IDLE   0.060        840.0    19.393    891.559     1.000       19.00      6.141     282.33     21.751     266.00    0.02309
TAKEOFF     1.000      14000.0    10.484   8910.309     1.000        0.70      0.122     103.95      1.177     163.33    0.00075
CLIMBOUT    0.850      11900.0    10.594   7423.398     1.000        2.20      0.388     272.19      1.427     436.33    0.00089
APPROACH    0.400       5600.0    14.186   3520.968     1.000        4.00      0.946     234.73      4.029     373.33    0.00253
TAXI-IDLE   0.060        840.0    19.393    891.559     1.000        7.00      2.262     104.02     21.751      98.00    0.02309

                                 TOTAL FOR CYCLE:                              9.860     997.22               1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               9.887
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              7.375
                                 LBS POLLUTANT/1000K LB TH AT T.O.:            0.874


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN      HC        FUEL     LB HC /     ENERGY    LB HC /
            POWER       # TH       RATE       RATE     WT FACTOR     MODE       MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.       LBS.       LBS.

TAXI-IDLE   0.060        840.0     3.824    891.559     1.000       19.00      1.211     282.33      4.289     266.00    0.00455
TAKEOFF     1.000      14000.0     0.326   8910.309     1.000        0.70      0.004     103.95      0.037     163.33    0.00002
CLIMBOUT    0.850      11900.0     0.423   7423.398     1.000        2.20      0.015     272.19      0.057     436.33    0.00004
APPROACH    0.400       5600.0     0.837   3520.968     1.000        4.00      0.056     234.73      0.238     373.33    0.00015
TAXI-IDLE   0.060        840.0     3.824    891.559     1.000        7.00      0.446     104.02      4.289      98.00    0.00455

                                 TOTAL FOR CYCLE:                              1.732     997.22               1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               1.737
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              1.295
                                 LBS POLLUTANT/1000K LB TH AT T.O.:            0.271


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE      TIME IN     NOX        FUEL     LB NOX/     ENERGY    LB NOX/
            POWER       # TH       RATE       RATE     WT FACTOR     MODE       MASS       MASS   1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.       LBS.       LBS.

TAXI-IDLE   0.060        840.0     3.096    891.559     1.000       19.00      0.980     282.33      3.472     266.00    0.00369
TAKEOFF     1.000      14000.0   231.395   8910.309     1.000        0.70      2.700     103.95     25.969     163.33    0.01653
CLIMBOUT    0.850      11900.0   151.836   7423.398     1.000        2.20      5.567     272.19     20.454     436.33    0.01276
APPROACH    0.400       5600.0    40.701   3520.968     1.000        4.00      2.713     234.73     11.560     373.33    0.00727
TAXI-IDLE   0.060        840.0     3.096    891.559     1.000        7.00      0.361     104.02      3.472      98.00    0.00369

                                 TOTAL FOR CYCLE:                             12.322     997.22               1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              12.356
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              9.216
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          192.829
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DATE:   7/13/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ********************************************************************************************************

    CAL ID NUMBER:  132    ENGINE TYPE AND MODEL:  JT8D-1                    SERIAL NUMBER:    649340

                           RATED THRUST:         14000.

    ENGINE TOTAL TIME:                            13276. HRS

    TIME SINCE HOT SECTION OVERHAUL:                 0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                  13535. HRS
         N2 COMPRESSOR OVERHAUL:                  13426. HRS
         COMBUSTOR CAN REPLACEMENT:                   0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
         N1 TURBINE OVERHAUL:                         0. HRS
         N2 TURBINE OVERHAUL:                         0. HRS

    FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   53.96   FINISH   53.60

     ATMOSPHERIC PRESSURE:              START   29.75   FINISH   29.75

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0048

     RELATIVE HUMIDITY:                    54.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    1.50

     SAMPLE LINE TRANSPORT TIME, SEC:    5.00

NUMBER OF TESTS:   4

COMMENTS:

 EXHAUST GAS PRESSURE IS IN INCHES HG.
 NEW SMOKELESS BURNERS


 CLOCK      TEST          POWER                  ENGINE            MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE     TURBINE
 TIME       MODE     THRUST,LBS  PERCENT          SPEED              FUEL    AIR FLOW     F/A      DISCHARGE    PRESSURE     INLET
                         OR       RATED            RPM               FLOW     LB/SEC                 TEMP        RATIO       TEMP
                        SHP       T.O.       N1          N2          LB/HR                         DEGREES F      EPR      DEGREES F

  550.00    1/ 0    10755.00        76     7369.00  10948.00      6167.00     -0.00   -0.000000      -0.00        1.73        -0.00
  554.00    2/ 1    12060.00        86     7674.00  11162.00      6946.00     -0.00   -0.000000      -0.00        1.84        -0.00
  557.00    3/ 2    13433.00        95     7714.00  11220.00      7893.00     -0.00   -0.000000      -0.00        1.96        -0.00
 1442.00    4/ 3      861.00         6     5798.00   6976.00      1096.00     -0.00   -0.000000      -0.00       -0.00        -0.00


 POWER    EXHAUST       EXHAUST          CO         CO        THC       NO        NO         NO       ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS           GAS          (WET)         2       (WET)     (WET)        2          X
 RATED     TEMP        PRESSURE         PPMV      (WET)       PPMV      PPMV     (WET)      (WET)
 T.O.    DEGREES F       PSIA                   PERCENT V                        PPMV       PPMV

  76      865.40         51.50         10.00       2.55       2.10    104.00     -0.00     126.00      -0.00      -0.00      -0.00
  86      906.80         54.80         10.50       2.70       2.10    132.00     -0.00     146.00      -0.00      -0.00      -0.00
  95      959.00         58.30         10.50       2.85       2.25    162.00     -0.00     172.00      -0.00      -0.00      -0.00
   6      687.20         31.30         20.00       2.25      15.60      2.50     -0.00       3.00      -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  76        0.79      0.09     -0.00    3154.39     13.45     16.29      4.86      0.58     -0.00  19453.14     82.94    100.49
  86        0.78      0.09     -0.00    3154.42     16.12     17.83      5.42      0.62     -0.00  21910.57    111.98    123.86
  95        0.74      0.09     -0.00    3154.48     18.74     19.90      5.84      0.72     -0.00  24898.29    147.95    157.09
   6        1.78      0.80     -0.00    3150.90      0.37      0.44      1.94      0.86     -0.00   3421.88      0.40      0.48


 POWER           CO                CO                THC                NO                NO                NO
PERCENT                             2                                                      2                 X
 RATED      LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

  76           0.451           1808.753            0.054             7.712            -0.000             9.343
  86           0.450           1816.797            0.052             9.285            -0.000            10.270
  95           0.435           1853.517            0.053            11.014            -0.000            11.694
   6           2.248           3974.309            1.004             0.462            -0.000             0.554
   CAL ID NUMBER:  132   ENGINE TYPE AND MODEL: JT8D-1              SERIAL NUMBER:   649340

TEST ORGANIZATION:  UNITED/EPA


  MODE   FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /    ENERGY   LB CO /
            POWER       # TH      RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060       840.0     2.247   1089.509     1.000      19.00      0.711     345.01      2.062     266.00    0.00267
TAKEOFF     1.000     14000.0     5.693   8210.797     1.000       0.70      0.066      95.79      0.693     163.33    0.00041
CLIMBOUT    0.850     11900.0     5.352   7026.547     1.000       2.20      0.196     257.64      0.762     436.33    0.00045
APPROACH    0.400      5600.0     3.074   3449.023     1.000       4.00      0.205     229.93      0.891     373.33    0.00055
TAXI-IDLE   0.060       840.0     2.247   1089.509     1.000       7.00      0.262     127.11      2.062      98.00    0.00267

                                 TOTAL FOR CYCLE:                          1.441    1055.49                1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           1.365
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          1.078
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        0.474


  MODE   FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /    ENERGY   LB HC /
            POWER       # TH      RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060       840.0     0.869   1089.509     1.000      19.00      0.275     345.01      0.798     266.00    0.00104
TAKEOFF     1.000     14000.0     0.565   8210.797     1.000       0.70      0.007      95.79      0.069     163.33    0.00004
CLIMBOUT    0.850     11900.0     0.478   7026.547     1.000       2.20      0.018     257.64      0.068     436.33    0.00004
APPROACH    0.400      5600.0     0.492   3449.023     1.000       4.00      0.033     229.93      0.143     373.33    0.00009
TAXI-IDLE   0.060       840.0     0.869   1089.509     1.000       7.00      0.101     127.11      0.798      98.00    0.00104

                                 TOTAL FOR CYCLE:                          0.434    1055.49                1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           0.411
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          0.324
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        0.471


  MODE   FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/    ENERGY   LB NOX/
            POWER       # TH      RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                 LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060       840.0     0.438   1089.509     1.000      19.00      0.139     345.01      0.402     266.00    0.00052
TAKEOFF     1.000     14000.0   167.922   8210.797     1.000       0.70      1.959      95.79     20.451     163.33    0.01199
CLIMBOUT    0.850     11900.0   123.556   7026.547     1.000       2.20      4.530     257.64     17.584     436.33    0.01038
APPROACH    0.400      5600.0    31.446   3449.023     1.000       4.00      2.096     229.93      9.117     373.33    0.00562
TAXI-IDLE   0.060       840.0     0.438   1089.509     1.000       7.00      0.051     127.11      0.402      98.00    0.00052

                                 TOTAL FOR CYCLE:                          8.776    1055.49                1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           8.314
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          6.564
                                 LBS POLLUTANT/1000K LB TH AT T.O.:      139.935
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DATE: 7/20/71

TEST ORGANIZATION: U.S. BUREAU OF MINES

ENGINE SUPPLIER: AMERICAN AIRLINES

ENGINE DATA **

CAL ID NUMBER: 291 ENGINE TYPE AND MODEL: JT8D-1 SERIAL NUMBER: 648920

RATED THRUST: 14000.

ENGINE TOTAL TIME: 15449. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	0. HRS
N2 COMPRESSOR OVERHAUL:	0. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	0. HRS
N1 TURBINE OVERHAUL:	0. HRS
N2 TURBINE OVERHAUL:	0. HRS

FUEL: JET - A FUEL H/C RATIO: 1.920

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 78.00 FINISH 79.00

ATMOSPHERIC PRESSURE: START 29.50 FINISH 29.50

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0080

RELATIVE HUMIDITY: 34.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 135.00, FLOW RATE, LITERS/MIN: 16.00

SAMPLE LINE TRANSPORT TIME, SEC: 0.90

NUMBER OF TESTS: 5

COMMENTS:

H/C IS CAL-ESTIMATED
PROBE POSITIONED 18" FROM TAILPIPE EXIT PLANE
(UNBALANCED PROBE CONFIGURATION REQUIRES MOUNTING NEAR STAND)
SAMPLE LINE TEMP. AVERAGED
WITH RETROFIT

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1130.00	1/ 0	10900.00	77	7600.00	11200.00	6410.00	-0.00	-0.000000	-0.00	1.74	-0.00
1135.00	2/ 1	11980.00	85	7850.00	11410.00	7090.00	-0.00	-0.000000	-0.00	1.83	-0.00
1145.00	3/ 2	12760.00	91	8035.00	11560.00	7630.00	-0.00	-0.000000	-0.00	1.90	-0.00
1150.00	4/ 3	1040.00	7	2980.00	7310.00	1068.00	-0.00	-0.000000	-0.00	1.06	-0.00
1205.00	5/ 4	9610.00	68	7280.00	11000.00	5590.00	-0.00	-0.000000	-0.00	1.63	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO 2 (WET) PPMV	NO x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
77	920.00	25.05	16.50	2.26	4.30	101.80	8.50	110.30	0.35	-0.00	-0.00
85	955.00	26.35	17.50	2.44	1.70	124.10	9.00	133.10	0.45	-0.00	-0.00
91	990.00	27.35	17.50	2.59	1.30	144.90	10.00	154.90	0.41	-0.00	-0.00
7	670.00	15.05	101.00	0.69	47.50	5.10	0.80	5.90	4.15	-0.00	-0.00
68	875.00	23.43	20.50	2.03	1.70	79.10	1.80	80.90	0.32	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
77	1.47	0.22	1.24	3152.99	14.85	16.09	9.39	1.40	7.95	20210.64	95.17	103.12
85	1.44	0.08	1.22	3153.41	16.77	17.98	10.21	0.57	8.62	22357.66	118.87	127.50
91	1.36	0.06	1.27	3153.60	18.44	19.72	10.35	0.44	9.71	24061.96	140.73	150.44
7	28.78	7.75	0.37	3089.40	2.39	2.76	30.74	8.28	0.40	3299.48	2.55	2.95
68	2.03	0.10	0.29	3152.44	12.84	13.13	11.33	0.54	1.63	17622.15	71.78	73.42

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO 2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO 2 LB/1K#TH-HR	NO x LB/1K#TH-HR
77	0.862	1854.187	0.129	8.731	0.729	9.460
85	0.852	1866.249	0.047	9.923	0.720	10.642
91	0.811	1835.733	0.035	11.029	0.761	11.790
7	29.556	3172.576	7.961	2.451	0.385	2.836
68	1.179	1833.730	0.056	7.470	0.170	7.640

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     CAL ID NUMBER:  291   ENGINE TYPE AND MODEL: JT8D-1               SERIAL NUMBER:  648920

 TEST ORGANIZATION:  U.S. BUREAU OF MINES


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL     LB CO /     ENERGY    LB CO /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

 TAXI-IDLE   0.060       840.0    24.991     834.939     1.000       19.00     7.914       264.40     29.931     266.00     0.02975
 TAKEOFF     1.000     14000.0     9.075    8369.012     1.000        0.70     0.106        97.64      1.084     163.33     0.00065
 CLIMBOUT    0.850     11900.0     9.353    7057.273     1.000        2.20     0.343       258.77      1.325     436.33     0.00079
 APPROACH    0.400      5600.0    17.363    3354.049     1.000        4.00     1.158       223.60      5.177     373.33     0.00310
 TAXI-IDLE   0.060       840.0    24.991     834.939     1.000        7.00     2.916        97.41     29.931      98.00     0.02975

                                 TOTAL FOR CYCLE:                             12.436       941.81               1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              13.204
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              9.301
                                 LBS POLLUTANT/1000K LB TH AT T.O.:            0.756


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL     LB HC /     ENERGY    LB HC /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

 TAXI-IDLE   0.060       840.0     7.643     834.939     1.000       19.00     2.420       264.40      9.154     266.00     0.00910
 TAKEOFF     1.000     14000.0     0.0      8369.012     1.000        0.70     0.0          97.64      0.0       163.33     0.0
 CLIMBOUT    0.850     11900.0     0.642    7057.273     1.000        2.20     0.024       258.77      0.091     436.33     0.00005
 APPROACH    0.400      5600.0     2.619    3354.049     1.000        4.00     0.175       223.60      0.781     373.33     0.00047
 TAXI-IDLE   0.060       840.0     7.643     834.939     1.000        7.00     0.892        97.41      9.154      98.00     0.00910

                                 TOTAL FOR CYCLE:                              3.510       941.81               1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               3.727
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              2.625
                                 LBS POLLUTANT/1000K LB TH AT T.O.:            0.0


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      NOX        FUEL     LB NOX/     ENERGY    LB NOX/
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

 TAXI-IDLE   0.060       840.0     1.995     834.939     1.000       19.00     0.632       264.40      2.389     266.00     0.00238
 TAKEOFF     1.000     14000.0   188.105    8369.012     1.000        0.70     2.195        97.64     22.476     163.33     0.01344
 CLIMBOUT    0.850     11900.0   127.245    7057.273     1.000        2.20     4.666       258.77     18.030     436.33     0.01069
 APPROACH    0.400      5600.0    29.583    3354.049     1.000        4.00     1.972       223.60      8.820     373.33     0.00528
 TAXI-IDLE   0.060       840.0     1.995     834.939     1.000        7.00     0.233        97.41      2.389      98.00     0.00238

                                 TOTAL FOR CYCLE:                              9.697       941.81               1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              10.296
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              7.253
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          156.754
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DATE: 7/21/71

TEST ORGANIZATION: U.S. BUREAU OF MINES

ENGINE SUPPLIER: AMERICAN AIRLINES

ENGINE DATA **

CAL ID NUMBER: 293 ENGINE TYPE AND MODEL: JT8D-1 SERIAL NUMBER: 648822

RATED THRUST: 14000.

ENGINE TOTAL TIME: 14661. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 0. HRS
N2 COMPRESSOR OVERHAUL: 0. HRS
COMBUSTOR CAN REPLACEMENT: 0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 0. HRS
N1 TURBINE OVERHAUL: 0. HRS
N2 TURBINE OVERHAUL: 0. HRS

FUEL: JET - A FUEL H/C RATIO: 1.920

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 89.00 FINISH 90.00

ATMOSPHERIC PRESSURE: START 29.30 FINISH 29.30

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0090

RELATIVE HUMIDITY: 27.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 132.00, FLOW RATE, LITERS/MIN: 16.00

SAMPLE LINE TRANSPORT TIME, SEC: 0.99

NUMBER OF TESTS: 5

COMMENTS:

H/C IS CAL-ESTIMATED
PROBE LOCATED 18" FROM TAILPIPE EXIT PLANE
(CONFIG. SAME AS USED ON 7-16-71 TEST)
N(1) COUNTER NOT OPERATING
SAMPLE LINE TEMP.AVERAGED
WITH RETROFIT

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
320.00	4/ 0	970.00	6	-0.00	7225.00	1060.00	-0.00	-0.000000	-0.00	1.04	-0.00
345.00	1/ 4	10080.00	71	-0.00	11165.00	5930.00	-0.00	-0.000000	-0.00	1.69	-0.00
350.00	2/ 1	11640.00	83	-0.00	11410.00	7050.00	-0.00	-0.000000	-0.00	1.83	-0.00
355.00	3/ 2	12450.00	88	-0.00	11535.00	7270.00	-0.00	-0.000000	-0.00	1.90	-0.00
400.00	4/ 3	950.00	6	-0.00	7238.00	1012.00	-0.00	-0.000000	-0.00	1.04	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
6	730.00	14.99	188.00	0.93	-0.00	2.20	5.00	7.20	4.53	-0.00	-0.00
71	960.00	23.95	14.00	2.24	1.70	90.50	10.50	101.00	-0.00	-0.00	-0.00
83	995.00	25.88	13.50	2.49	2.60	122.60	12.00	134.60	-0.00	-0.00	-0.00
88	1050.00	26.85	14.00	2.57	2.80	136.70	13.00	149.70	-0.00	-0.00	-0.00
6	730.00	14.99	111.00	0.77	46.40	4.30	4.50	8.80	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
6	39.80	-0.00	1.74	3093.36	0.76	2.50	42.19	-0.00	1.84	3278.96	0.81	2.65
71	1.25	0.09	1.55	3153.68	13.32	14.87	7.44	0.52	9.16	18701.30	78.99	88.15
83	1.09	0.12	1.59	3153.85	16.23	17.82	7.67	0.85	11.20	22234.63	114.45	125.65
88	1.09	0.13	1.67	3153.93	17.54	19.20	7.95	0.91	12.12	22928.32	127.49	139.62
6	28.37	6.79	1.89	3092.67	1.81	3.69	28.71	6.87	1.91	3129.78	1.83	3.74

POWER PERCENT RATED T.O.	CO LB/1K*TH-HR	CO_2 LB/1K*TH-HR	THC LB/1K*TH-HR	NO LB/1K*TH-HR	NO_2 LB/1K*TH-HR	NO_x LB/1K*TH-HR
6	43.491	3380.367	-0.000	0.836	1.900	2.736
71	0.738	1855.288	0.051	7.836	0.909	8.745
83	0.659	1910.192	0.073	9.832	0.962	10.795
88	0.639	1841.632	0.073	10.240	0.974	11.214
6	30.226	3294.503	7.236	1.923	2.013	3.936

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    CAL ID NUMBER:  293   ENGINE TYPE AND MODEL: JT8D-1                 SERIAL NUMBER:  648822

TEST ORGANIZATION:  U.S. BUREAU OF MINES


  MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN      CO         FUEL     LB CO /     ENERGY    LB CO /
             POWER        # TH      RATE       RATE      WT FACTOR     MODE      MASS        MASS   1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                    MIN.      LBS.        LBS.

TAXI-IDLE   0.060        840.0    35.880     971.287      1.000       19.00    11.362      307.57     36.941     266.00    0.04271
TAKEOFF     1.000      14000.0     3.410    8319.148      1.000        0.70     0.040       97.06      0.410     163.33    0.00024
CLIMBOUT    0.850      11900.0     6.047    7014.898      1.000        2.20     0.222      257.21      0.862     436.33    0.00051
APPROACH    0.400       5600.0    17.430    3354.598      1.000        4.00     1.162      223.64      5.196     373.33    0.00311
TAXI-IDLE   0.060        840.0    35.880     971.287      1.000        7.00     4.186      113.32     36.941      98.00    0.04271

                                  TOTAL FOR CYCLE:                             16.971      998.80                1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:              16.992
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:             12.694
                                  LBS POLLUTANT/1000K LB TH AT T.O.:            0.284


  MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN      HC         FUEL     LB HC /     ENERGY    LB HC /
             POWER        # TH      RATE       RATE      WT FACTUR     MODE      MASS        MASS   1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                    MIN.      LBS.        LBS.

TAXI-IDLE   0.060        840.0     6.613     971.287      1.000       19.00     2.094      307.57      6.809     266.00    0.00787
TAKEOFF     1.000      14000.0     0.245    8319.148      1.000        0.70     0.003       97.06      0.029     163.33    0.00002
CLIMBOUT    0.850      11900.0     0.581    7014.898      1.000        2.20     0.021      257.21      0.083     436.33    0.00005
APPROACH    0.400       5600.0     1.796    3354.598      1.000        4.00     0.120      223.64      0.535     373.33    0.00032
TAXI-IDLE   0.060        840.0     6.613     971.287      1.000        7.00     0.772      113.32      6.809      98.00    0.00787

                                  TOTAL FOR CYCLE:                              3.010      998.80                1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:               3.013
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:              2.251
                                  LBS POLLUTANT/1000K LB TH AT T.O.:            0.204


  MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN     NOX         FUEL     LB NOX/     ENERGY    LB NOX/
             POWER        # TH      RATE       RATE      WT FACTOR     MODE      MASS        MASS   1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                    MIN.      LBS.        LBS.

TAXI-IDLE   0.060        840.0     2.846     971.287      1.000       19.00     0.901      307.57      2.930     266.00    0.00339
TAKEOFF     1.000      14000.0   187.627    8319.148      1.000        0.70     2.189       97.06     22.554     163.33    0.01340
CLIMBOUT    0.850      11900.0   128.154    7014.898      1.000        2.20     4.699      257.21     18.269     436.33    0.01077
APPROACH    0.400       5600.0    34.273    3354.598      1.000        4.00     2.285      223.64     10.217     373.33    0.00612
TAXI-IDLE   0.060        840.0     2.846     971.287      1.000        7.00     0.332      113.32      2.930      98.00    0.00339

                                  TOTAL FOR CYCLE:                             10.406      998.80                1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:              10.418
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:              7.783
                                  LBS POLLUTANT/1000K LB TH AT T.O.:          156.355
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DATE: 7/15/71

TEST ORGANIZATION: UNITED/EPA

ENGINE SUPPLIER: UNITED AIRLINES

ENGINE DATA **

CAL ID NUMBER: 404 ENGINE TYPE AND MODEL: JT8D-1 SERIAL NUMBER: 653428

RATED THRUST: 14000.

ENGINE TOTAL TIME: 12937. HRS

TIME SINCE HOT SECTION OVERHAUL: 8829. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	14420. HRS
N2 COMPRESSOR OVERHAUL:	15057. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	0. HRS
N1 TURBINE OVERHAUL:	0. HRS
N2 TURBINE OVERHAUL:	0. HRS

FUEL: JET - A FUEL H/C RATIO: 1.920

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 65.30 FINISH 66.20

ATMOSPHERIC PRESSURE: START 29.77 FINISH 29.82

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0074

RELATIVE HUMIDITY: 55.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 160.00, FLOW RATE, LITERS/MIN: 1.50

SAMPLE LINE TRANSPORT TIME, SEC: 5.00

NUMBER OF TESTS: 4

COMMENTS:

EXHAUST GAS PRESSURE IN INCHES HG.
EXHAUST GAS TEMPERATURE IN DEGREES C
NEW SMOKELESS BURNERS

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1436.00	1/ 0	10842.00	77	7436.00	10986.00	6329.00	-0.00	-0.000000	-0.00	1.73	-0.00
1453.00	2/ 1	12241.00	87	7760.00	11211.00	7236.00	-0.00	-0.000000	-0.00	1.85	-0.00
1457.00	3/ 2	13414.00	95	8040.00	11397.00	8054.00	-0.00	-0.000000	-0.00	1.95	-0.00
1716.00	4/ 3	1035.00	7	2972.00	7220.00	1162.00	-0.00	-0.000000	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO2 (WET) PPMV	NOx (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
77	490.00	51.70	28.00	2.45	1.50	91.00	-0.00	98.00	-0.00	-0.00	-0.00
87	506.00	55.20	30.00	2.60	1.50	120.00	-0.00	125.00	-0.00	-0.00	-0.00
95	528.00	58.20	30.00	2.75	1.80	142.00	-0.00	147.00	-0.00	-0.00	-0.00
7	359.00	31.40	50.00	0.55	11.40	3.60	-0.00	4.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
77	2.29	0.07	-0.00	3152.09	12.24	13.18	14.51	0.45	-0.00	19949.60	77.46	83.42
87	2.31	0.07	-0.00	3152.07	15.21	15.84	16.75	0.48	-0.00	22808.39	110.05	114.63
95	2.19	0.08	-0.00	3152.25	17.02	17.62	17.63	0.61	-0.00	25388.19	137.05	141.87
7	18.06	2.36	-0.00	3121.05	2.14	2.37	20.98	2.74	-0.00	3626.65	2.48	2.76

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO2 LB/1K#TH-HR	NOx LB/1K#TH-HR
77	1.339	1940.029	0.041	7.145	-0.000	7.694
87	1.368	1863.278	0.039	8.990	-0.000	9.365
95	1.314	1892.663	0.045	10.217	-0.000	10.576
7	20.274	3504.014	2.647	2.398	-0.000	2.664

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    CAL ID NUMBER:  404   ENGINE TYPE AND MODEL: JT8D-1                SERIAL NUMBER:   653428

TEST ORGANIZATION:  UNITED/EPA

  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     CO        FUEL     LB CO /     ENERGY    LB CO /
             POWER      # TH      RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060       840.0    17.309     924.629    1.000      19.00     5.481     292.80     18.720     266.00    0.02061
TAKEOFF     1.000     14000.0    16.324    8492.324    1.000       0.70     0.190      99.08      1.922     163.33    0.00117
CLIMBOUT    0.850     11900.0    15.427    7125.680    1.000       2.20     0.566     261.27      2.165     436.33    0.00130
APPROACH    0.400      5600.0    16.054    3302.655    1.000       4.00     1.070     220.18      4.861     373.33    0.00287
TAXI-IDLE   0.060       840.0    17.309     924.629    1.000       7.00     2.019     107.87     18.720      98.00    0.02061

                             TOTAL FOR CYCLE:                               9.327     981.20                1337.00
                             LBS POLLUTANT/1K LB FUEL/CYCLE:                9.506
                             LBS POLLUTANT/1K LB TH-HR/CYCLE:               6.976
                             LBS POLLUTANT/1000K LB TH AT T.O.:             1.360

  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     HC        FUEL     LB HC /     ENERGY    LB HC /
             POWER      # TH      RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060       840.0     2.950     924.629    1.000      19.00     0.934     292.80      3.190     266.00    0.00351
TAKEOFF     1.000     14000.0     0.394    8492.324    1.000       0.70     0.005      99.08      0.046     163.33    0.00003
CLIMBOUT    0.850     11900.0     0.507    7125.680    1.000       2.20     0.019     261.27      0.071     436.33    0.00004
APPROACH    0.400      5600.0     0.842    3302.655    1.000       4.00     0.056     220.18      0.255     373.33    0.00015
TAXI-IDLE   0.060       840.0     2.950     924.629    1.000       7.00     0.344     107.87      3.190      98.00    0.00351

                             TOTAL FOR CYCLE:                               1.358     981.20                1337.00
                             LBS POLLUTANT/1K LB FUEL/CYCLE:                1.384
                             LBS POLLUTANT/1K LB TH-HR/CYCLE:               1.015
                             LBS POLLUTANT/1000K LB TH AT T.O.:             0.328

  MODE    FRACTIONAL    POWER   EMISSION     FUEL       USAGE     TIME IN     NOX       FUEL     LB NOX/     ENERGY    LB NOX/
             POWER      # TH      RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                 MIN.      LBS.       LBS.

TAXI-IDLE   0.060       840.0     1.815     924.629    1.000      19.00     0.575     292.80      1.963     266.00    0.00216
TAKEOFF     1.000     14000.0   160.015    8492.324    1.000       0.70     1.867      99.08     18.842     163.33    0.01143
CLIMBOUT    0.850     11900.0   107.678    7125.680    1.000       2.20     3.948     261.27     15.111     436.33    0.00905
APPROACH    0.400      5600.0    25.792    3302.655    1.000       4.00     1.719     220.18      7.809     373.33    0.00461
TAXI-IDLE   0.060       840.0     1.815     924.629    1.000       7.00     0.212     107.87      1.963      98.00    0.00216

                             TOTAL FOR CYCLE:                               8.321     981.20                1337.00
                             LBS POLLUTANT/1K LB FUEL/CYCLE:                8.481
                             LBS POLLUTANT/1K LB TH-HR/CYCLE:               6.224
                             LBS POLLUTANT/1000K LB TH AT T.O.:           133.346
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DATE:  6/29/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:   UNITED AIRLINES

ENGINE DATA ****************************************************************************************************

    CAL ID NUMBER:  123    ENGINE TYPE AND MODEL:  JT8D-7                    SERIAL NUMBER:    649361

                          RATED THRUST:        14000.

    ENGINE TOTAL TIME:                           14869. HRS

    TIME SINCE HOT SECTION OVERHAUL:              4064. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                 12192. HRS
         N2 COMPRESSOR OVERHAUL:                 10281. HRS
         COMBUSTOR CAN REPLACEMENT:                 0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    0. HRS
         N1 TURBINE OVERHAUL:                       0. HRS
         N2 TURBINE OVERHAUL:                       0. HRS

    FUEL: JET - A            FUEL H/C RATIO:   1.920

OPERATIONAL DATA ****************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   59.90   FINISH   63.50

    ATMOSPHERIC PRESSURE:              START   29.94   FINISH   30.00

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0076

    RELATIVE HUMIDITY:                     69.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    1.50

    SAMPLE LINE TRANSPORT TIME, SEC:    5.00

 NUMBER OF TESTS:   4

 COMMENTS:

  EXHAUST GAS PRESSURE IN INCHES HG
  SMOKELESS BURNERS


  CLOCK      TEST          POWER              ENGINE           MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
  TIME       MODE    THRUST,LBS  PERCENT      SPEED              FUEL     AIR FLOW      F/A     DISCHARGE    PRESSURE      INLET
                         OR       RATED        RPM               FLOW      LB/SEC                  TEMP        RATIO        TEMP
                        SHP       T.O.     N1         N2         LB/HR                          DEGREES F       EPR      DEGREES F

                                                                                                                          -0.00
  835.00     1/ 0   11050.00       78    7395.00  11099.00     6321.00     -0.00   -0.000000     -0.00        1.75         -0.00
  840.00     2/ 1   12250.00       87    7670.00  11303.00     7086.00     -0.00   -0.000000     -0.00        1.85         -0.00
  845.00     3/ 2   13550.00       96    7996.00  11521.00     8013.00     -0.00   -0.000000     -0.00        1.96         -0.00
 1005.00     4/ 3    1050.00        7    2942.00   7228.00     1133.00     -0.00   -0.000000     -0.00       -0.00


  POWER    EXHAUST      EXHAUST        CO        CO        THC      NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS         (WET)        2       (WET)    (WET)       2         X
  RATED     TEMP        PRESSURE      PPMV      (WET)      PPMV     PPMV     (WET)     (WET)
  T.O.    DEGREES F       PSIA                PERCENT V                     PPMV      PPMV

   78      869.00        52.40        30.00      2.26      0.60     95.00    -0.00    100.00     -0.00      -0.00      -0.00
   87      906.80        55.30        20.00      2.60      0.45    102.50    -0.00    105.00     -0.00      -0.00      -0.00
   96      951.80        58.80        15.00      2.71      0.60    150.00    -0.00    154.70     -0.00      -0.00      -0.00
    7      676.40        31.50        60.00      0.33     16.50      2.50    -0.00      3.20     -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2        NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   78        2.66      0.03     -0.00    3151.67     13.85     14.58     16.83      0.19     -0.00   19921.40     87.54     92.15
   87        1.54      0.02     -0.00    3153.41     13.00     13.71     10.94      0.14     -0.00   22345.05     92.09     94.34
   96        1.11      0.03     -0.00    3154.07     18.25     18.82      9.90      0.20     -0.00   25273.59    146.24    150.82
    7       35.69      5.62     -0.00    3084.39      2.44      3.13     40.44      6.37     -0.00    3494.61      2.77      3.54


                                                                              NO                NO
  POWER          CO               CO              THC            NO            2                 X
 PERCENT                            2
  RATED     LB/1K#TH-HR      LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR    LB/1K#TH-HR     LB/1K#TH-HR
  T.O.

   78           1.523         1802.642          0.017           7.922         -0.000           8.339
   87           0.893         1824.096          0.012           7.518         -0.000           7.701
   96           0.657         1865.210          0.015          10.793         -0.000          11.131
    7          38.513         3328.201          6.066           2.636         -0.000           3.374
    CAL ID NUMBER:  123   ENGINE TYPE AND MODEL: JT8D-7                  SERIAL NUMBER:   649361

TEST ORGANIZATION:  UNITED/EPA


  MODE     FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL     LB CO /     ENERGY    LB CO /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060        840.0    32.538     890.156     1.000       19.00    10.304      281.88     36.553     266.00     0.03874
TAKEOFF     1.000      14000.0     4.281    8358.797     1.000        0.70     0.050       97.52      0.512     163.33     0.00031
CLIMBOUT    0.850      11900.0    12.632    6931.738     1.000        2.20     0.463      254.16      1.822     436.33     0.00106
APPROACH    0.400       5600.0    31.202    3394.577     1.000        4.00     2.080      226.31      9.192     373.33     0.00557
TAXI-IDLE   0.060        840.0    32.538     890.156     1.000        7.00     3.796      103.85     36.553      98.00     0.03874

                                  TOTAL FOR CYCLE:                            16.693      963.72                1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:             17.321
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:            12.485
                                  LBS POLLUTANT/1000K LB TH AT T.O.:           0.357


  MODE     FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL     LB HC /     ENERGY    LB HC /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060        840.0     5.982     890.156     1.000       19.00     1.894      281.88      6.720     266.00     0.00712
TAKEOFF     1.000      14000.0     0.0      8358.797     1.000        0.70     0.0         97.52      0.0       163.33     0.0
CLIMBOUT    0.850      11900.0     0.0      6931.738     1.000        2.20     0.0        254.16      0.0       436.33     0.0
APPROACH    0.400       5600.0     0.712    3394.577     1.000        4.00     0.047      226.31      0.210     373.33     0.00013
TAXI-IDLE   0.060        840.0     5.982     890.156     1.000        7.00     0.698      103.85      6.720      98.00     0.00712

                                  TOTAL FOR CYCLE:                             2.640      963.72                1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:              2.739
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:             1.974
                                  LBS POLLUTANT/1000K LB TH AT T.O.:           0.0


  MODE     FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX         FUEL     LB NOX/     ENERGY    LB NOX/
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060        840.0     2.211     890.156     1.000       19.00     0.700      281.88      2.484     266.00     0.00263
TAKEOFF     1.000      14000.0   163.301    8358.797     1.000        0.70     1.905       97.52     19.536     163.33     0.01166
CLIMBOUT    0.850      11900.0   110.775    6931.738     1.000        2.20     4.062      254.16     15.981     436.33     0.00931
APPROACH    0.400       5600.0    30.360    3394.577     1.000        4.00     2.024      226.31      8.944     373.33     0.00542
TAXI-IDLE   0.060        840.0     2.211     890.156     1.000        7.00     0.258      103.85      2.484      98.00     0.00263

                                  TOTAL FOR CYCLE:                             8.949      963.72                1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:              9.286
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:             6.693
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         136.084
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DATE:   7/30/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA ******************************************************************************************************
     CAL ID NUMBER:  347    ENGINE TYPE AND MODEL:  JT8D-7                          SERIAL NUMBER:   654133

                            RATED THRUST:         14000.

      ENGINE TOTAL TIME:                           9583. HRS

      TIME SINCE HOT SECTION OVERHAUL:                0. HRS

      TIME SINCE:

           N1 COMPRESSOR OVERHAUL:                    0. HRS
           N2 COMPRESSOR OVERHAUL:                    0. HRS
           COMBUSTOR CAN REPLACEMENT:                 0. HRS
           FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    0. HRS
           N1 TURBINE OVERHAUL:                    7003. HRS
           N2 TURBINE OVERHAUL:                       0. HRS

      FUEL: JET - A           FUEL H/C RATIO:   1.920
 OPERATIONAL DATA ***********************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   74.00   FINISH   75.00

      ATMOSPHERIC PRESSURE:              START   29.45   FINISH   29.45

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0100

      RELATIVE HUMIDITY:                 54.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  137.00,  FLOW RATE, LITERS/MIN:   16.00

      SAMPLE LINE TRANSPORT TIME, SEC:    0.99

 NUMBER OF TESTS:   5

 COMMENTS:

  H/C CAL ESTIMATED
  SAMPLE LINE TEMP. AVERAGED
  PROBE LOCATED 10" FROM TAILPIPE WITH RETROFIT


                                                                                                                      TURBINE
                                                        MEASURED   GAS GEN     CALC     COMPRESSOR     ENGINE        INLET
 CLOCK      TEST          POWER             ENGINE        FUEL     AIR FLOW    F/A      DISCHARGE     PRESSURE       TEMP
 TIME       MODE    THRUST,LBS  PERCENT     SPEED         FLOW      LB/SEC                TEMP          RATIO       DEGREES F
                       OR        RATED       RPM          LB/HR                        DEGREES F         EPR
                       SHP       T.C.     N1        N2

 1200.00    5/ 0    9910.00       70   7380.00  11110.00  5740.00    -0.00   -0.000000    -0.00          1.66          -0.00
 1205.00    1/ 5    1000.00        7   2890.00   7140.00  1045.00    -0.00   -0.000000    -0.00          1.05          -0.00
 1210.00    4/ 1   10860.00       77   7570.00  11270.00  6380.00    -0.00   -0.000000    -0.00          1.75          -0.00
 1215.00    3/ 4   12000.00       85   7840.00  11500.00  7120.00    -0.00   -0.000000    -0.00          1.85          -0.00
 1220.00    2/ 3   13300.00       94   8150.00  11730.00  8060.00    -0.00   -0.000000    -0.00          1.96          -0.00


                                         CO        CO      THC      NO       NO        NO      ALDEHYDES   SMOKE   PARTICULATES
 POWER     EXHAUST     EXHAUST          (WET)        2    (WET)    (WET)      2         X
 PERCENT     GAS         GAS            PPMV     (WET)    PPMV     PPMV    (WET)     (WET)
 RATED       TEMP      PRESSURE                PERCENT V                   PPMV      PPMV
 T.O.     DEGREES F     PSIA

   70      890.00      23.85            13.00     1.93     2.60    75.20    6.50     81.70     -0.00      -0.00      -0.00
    7      685.00      15.12            76.20     0.53    34.60     3.60    3.00      6.60     -0.00      -0.00      -0.00
   77      930.00      25.02            13.80     2.15     9.90    93.40    5.50     98.90     -0.00      -0.00      -0.00
   85      970.00      26.43            13.80     2.34     8.60   114.60    6.00    120.60     -0.00      -0.00      -0.00
   94     1075.00      27.97            13.30     2.59     6.90   142.90    8.00    150.90     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC       NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO       NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   70       1.35      0.15      1.11   3153.34     12.84     13.95      7.76      0.89      6.37  18100.18     73.73     80.10
    7      28.29      7.36      1.83   3091.26      2.20      4.02     29.56      7.69      1.91   3230.37      2.29      4.21
   77       1.29      0.53      0.84   3152.41     14.32     15.16      8.22      3.38      5.38  20112.39     91.34     96.72
   85       1.18      0.42      0.85   3152.87     16.14     16.99      8.43      3.01      6.02  22448.44    114.93    120.95
   94       1.07      0.31      1.02   3153.37     18.19     19.21      8.62      2.47      8.21  25416.15    146.60    154.80


 POWER                                                                                   NO                 NO
 PERCENT         CO               CO              THC              NO                   2                  X
 RATED                             2                                                                     
 T.O.       LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR         LB/1K#TH-HR        LB/1K#TH-HR

   70          0.743          1826.456          0.090            7.440               0.643              8.083
    7         29.559          3230.367          7.687            2.294               1.912              4.205
   77          0.757          1851.970          0.311            8.411               0.495              8.906
   85          0.702          1870.703          0.251            9.578               0.501             10.079
   94          0.648          1910.989          0.196           11.022               0.617             11.639
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     CAL ID NUMBER:  347   ENGINE TYPE AND MODEL: JT8D-7                 SERIAL NUMBER:  654133

TEST ORGANIZATION:  U.S. BUREAU OF MINES


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL    LB CO /    ENERGY    LB CO /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060       840.0    26.479     908.471     1.000       19.00      8.385      287.68     29.146    266.00    0.03152
TAKEOFF     1.000     14000.0     6.853    8547.906     1.000        0.70      0.080       99.73      0.802    163.33    0.00049
CLIMBOUT    0.850     11900.0     7.130    7185.719     1.000        2.20      0.261      263.48      0.992    436.33    0.00060
APPROACH    0.400      5600.0    17.079    3287.870     1.000        4.00      1.139      219.19      5.194    373.33    0.00305
TAXI-IDLE   0.060       840.0    26.479     908.471     1.000        7.00      3.089      105.99     29.146     98.00    0.03152

                                 TOTAL FOR CYCLE:                             12.954      976.06               1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              13.272
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              9.689
                                 LBS POLLUTANT/1000K LB TH AT T.O.:            0.571


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL    LB HC /    ENERGY    LB HC /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060       840.0     6.951     908.471     1.000       19.00      2.201      287.68      7.651    266.00    0.00827
TAKEOFF     1.000     14000.0     1.882    8547.906     1.000        0.70      0.022       99.73      0.220    163.33    0.00013
CLIMBOUT    0.850     11900.0     2.650    7185.719     1.000        2.20      0.097      263.48      0.369    436.33    0.00022
APPROACH    0.400      5600.0     3.421    3287.870     1.000        4.00      0.228      219.19      1.041    373.33    0.00061
TAXI-IDLE   0.060       840.0     6.951     908.471     1.000        7.00      0.811      105.99      7.651     98.00    0.00827

                                 TOTAL FOR CYCLE:                              3.359      976.06               1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               3.442
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              2.512
                                 LBS POLLUTANT/1000K LB TH AT T.O.:            1.568


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX         FUEL    LB NOX/    ENERGY    LB NOX/
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS        MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.        LBS.

TAXI-IDLE   0.060       840.0     3.260     908.471     1.000       19.00      1.032      287.68      3.588    266.00    0.00388
TAKEOFF     1.000     14000.0   178.049    8547.906     1.000        0.70      2.077       99.73     20.830    163.33    0.01272
CLIMBOUT    0.850     11900.0   122.605    7185.719     1.000        2.20      4.496      263.48     17.062    436.33    0.01030
APPROACH    0.400      5600.0    32.072    3287.870     1.000        4.00      2.138      219.19      9.755    373.33    0.00573
TAXI-IDLE   0.060       840.0     3.260     908.471     1.000        7.00      0.380      105.99      3.588     98.00    0.00388

                                 TOTAL FOR CYCLE:                             10.123      976.06               1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              10.372
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              7.572
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          148.374
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DATE:   8/ 2/71

TEST ORGANIZATION:  U.S. BURFAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINF DATA ******************************************************************************************************

     CAL ID NUMBER:  348    FNGINF TYPE AND MODEL:  JT8D-7                       SERIAL NUMBER:   654374

                           RATFD THRUST:        14000.

     ENGINF TOTAL TIMF:                                 10486. HRS

     TIME SINGF HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCF:

          N1 COMPRESSOR OVERHAUL:                          0. HRS
          N2 COMPRESSOR OVERHAUL:                          0. HRS
          COMBUSTOR CAN REPLACEMENT:                       0. HRS
          FIRST STAGF NOZZLE GUIDE VANE OVERHAUL:          0. HRS
          N1 TURBINE OVFRHAUL:                             0. HRS
          N2 TURBINE OVFRHAUL:                             0. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   80.00   FINISH   -0.00

     ATMOSPHERIC PRESSURF:              START   29.30   FINISH   -0.00

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0120

     RELATIVE HUMIDITY:                       53.00  PFRCENT

     SAMPLE LINE:  TFMPERATURE, DEGRFFS C:  135.CC,  FLOW RATF, LITERS/MIN:   16.00

     SAMPLE LINF TRANSPORT TIMF, SEC:    0.99

NUMBER OF TESTS:   6

COMMENTS:

H/C CAL FSTIMATED SAMPLF LINE TEMP. AVFRAGED WITH RETROFIT


  CLOCK      TEST            POWER               ENGINE            MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE     TURBINE
  TIME       MODF     THRUST,LBS  PERCENT         SPFFD              FUEL     AIR FLOW    F/A     DISCHARGE    PRESSURF     INLET
                          OR       RATED           RPM               FLOW     LB/SEC                 TEMP        RATIO       TEMP
                         SHP       T.O.       N1          N2         LB/HR                        DEGREES F       FPR     DEGREES F

  135.00     4/ 0      990.00       7         0.0     7230.00     1065.00     -0.00   -0.000000     -0.00        1.04       -0.00
  150.00     5/ 4     9600.00      68     7300.00    10830.00     5670.00     -0.00   -0.000000     -0.00        1.65       -0.00
  155.00     4/ 5      920.00       6     2890.00     7115.00     1070.00     -0.00   -0.000000     -0.00        1.04       -0.00
  205.00     1/ 4    10850.00      77     7560.00    11025.00     6460.00     -0.00   -0.000000     -0.00        1.74       -0.00
  215.00     2/ 1    11750.00      83     7800.00    11230.00     7090.00     -0.00   -0.000000     -0.00        1.84       -0.00
  220.00     3/ 2    12120.00      86     7880.00    11275.00     7310.00     -0.00   -0.000000     -0.00        1.87       -0.00


  POWER    EXHAUST     FXHAUST        CO          CO        THC       NO        NO         NO      ALDEHYDES    SMOKE   PARTICULATES
 PERCENT     GAS         GAS         (WET)         2       (WET)     (WET)       2          X
  RATED      TEMP      PRESSURF      PPMV        (WFT)      PPMV      PPMV     (WET)      (WET)
  T.O.    DEGREES F      PSIA                  PERCFNT V                       PPMV       PPMV

    7       700.00      14.97       38.50       0.77      36.70      4.00      4.50       8.50     -0.00      -0.00      -0.00
   68       895.00      23.44       19.50       2.22       2.60     64.10     15.00      79.10     -0.00      -0.00      -0.00
    6       695.00      14.97       96.00       0.73      41.50      4.10      5.00       9.10     -0.00      -0.00      -0.00
   77       945.00      24.78       19.50       2.52       5.40     86.40     18.00     104.40     -0.00      -0.00      -0.00
   83       970.00      26.16       19.00       2.72       2.20    103.90     19.50     123.40     -0.00      -0.00      -0.00
   86       980.00      26.53       19.00       2.80       1.70    109.60     19.50     129.10     -0.00      -0.00      -0.00


  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCFNT     CO        HC        NO2       CO2        NO        NOX       CO        HC        NO2       CO2        NO        NOX
  RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LP/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LP FUFL   LB FUEL

    7      22.72      5.40      1.90    3105.39      1.69      3.58     24.19      5.75      2.02    3307.24      1.80      3.82
   68       1.76      0.13      2.23    3152.75      9.52     11.74      9.99      0.76     12.63   17876.10     53.96     66.59
    6      25.93      6.42      2.22    3097.54      1.82      4.04     27.74      6.87      2.37    3314.37      1.95      4.32
   77       1.55      0.25      2.35    3152.77     11.30     13.65     10.03      1.59     15.21   20366.91     73.00     88.21
   83       1.40      0.09      2.36    3153.43     12.59     14.96      9.94      0.66     14.76   22357.82     89.28    106.04
   86       1.36      0.07      2.30    3153.56     12.90     15.20      9.96      0.51     16.78   23052.50     94.33    111.11


  POWER          CO                 CO                THC               NO                 NO                 NO
 PERCFNT                             2                                                      2                  X
  RATFD     LB/1K#TH-HP        LB/1K#TH-HR        LB/1K#TH-HR       LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
  T.O.

    7          24.437           3340.651             5.804             1.814              2.041              3.855
   68           1.041           1862.094             0.079             5.621              1.315              6.936
    6          30.152           3602.578             7.465             2.115              2.580              4.695
   77           0.924           1877.135             0.147             6.728              1.402              8.130
   83           0.846           1902.794             0.056             7.599              1.426              9.024
   86           0.821           1902.021             0.042             7.783              1.385              9.168
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     CAL ID NUMBER:  348   ENGINE TYPE AND MODEL: JT8D-7                 SERIAL NUMBER:  654374

TEST ORGANIZATION:  U.S. BUREAU OF MINES


   MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL     LB CO /     ENERGY    LB CO /
             POWER        # TH       RATE       RATE     WT FACTOR     MODE      MASS        MASS   1K LB FUEL  # TH-HR   # TH-HR
                                    LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE   0.060        840.0    23.727     966.152     1.000       19.00     7.514       305.95     24.558     266.00    0.02825
TAKEOFF     1.000      14000.0     8.454    8664.551     1.000        0.70     0.099       101.09      0.976     163.33    0.00060
CLIMBOUT    0.850      11900.0     8.558    7293.980     1.000        2.20     0.314       267.45      1.173     436.33    0.00072
APPROACH    0.400       5600.0    16.453    3208.673     1.000        4.00     1.097       213.91      5.128     373.33    0.00294
TAXI-IDLE   0.060        840.0    23.727     966.152     1.000        7.00     2.768       112.72     24.558      98.00    0.02825

                                  TOTAL FOR CYCLE:                          11.791      1001.11                 1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:           11.778
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           8.819
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         0.705


   MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL     LB HC /     ENERGY    LB HC /
             POWER        # TH       RATE       RATE     WT FACTOR     MODE      MASS        MASS   1K LB FUEL  # TH-HR   # TH-HR
                                    LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE   0.060        840.0     6.138     966.152     1.000       19.00     1.944       305.95      6.353     266.00    0.00731
TAKEOFF     1.000      14000.0     0.0      8664.551     1.000        0.70     0.0         101.09      0.0       163.33    0.0
CLIMBOUT    0.850      11900.0     0.387    7293.980     1.000        2.20     0.014       267.45      0.053     436.33    0.00003
APPROACH    0.400       5600.0     1.911    3208.673     1.000        4.00     0.127       213.91      0.596     373.33    0.00034
TAXI-IDLE   0.060        840.0     6.138     966.152     1.000        7.00     0.716       112.72      6.353      98.00    0.00731

                                  TOTAL FOR CYCLE:                           2.801      1001.11                 1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            2.798
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           2.095
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         0.0


   MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN     NOX         FUEL     LB NOX/     ENERGY    LB NOX/
             POWER        # TH       RATE       RATE     WT FACTOR     MODE      MASS        MASS   1K LB FUEL  # TH-HR   # TH-HR
                                    LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE   0.060        840.0     3.590     966.152     1.000       19.00     1.137       305.95      3.716     266.00    0.00427
TAKEOFF     1.000      14000.0   166.816    8664.551     1.000        0.70     1.946       101.09     19.253     163.33    0.01192
CLIMBOUT    0.850      11900.0   111.933    7293.980     1.000        2.20     4.104       267.45     15.346     436.33    0.00941
APPROACH    0.400       5600.0    27.879    3208.673     1.000        4.00     1.859       213.91      8.689     373.33    0.00498
TAXI-IDLE   0.060        840.0     3.590     966.152     1.000        7.00     0.419       112.72      3.716      98.00    0.00427

                                  TOTAL FOR CYCLE:                           9.465      1001.11                 1337.00
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            9.454
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           7.079
                                  LBS POLLUTANT/1000K LB TH AT T.O.:       139.013
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DATE:   7/23/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ***************************************************************************************************

     CAL ID NUMBER:  409    ENGINE TYPE AND MODEL:  JT8D-7                   SERIAL NUMBER:     648770

                            RATED THRUST:        14000.

     ENGINE TOTAL TIME:                           15408. HRS

     TIME SINCE HOT SECTION OVERHAUL:             15408. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                 13921. HRS
          N2 COMPRESSOR OVERHAUL:                 10927. HRS
          COMBUSTOR CAN REPLACEMENT:                  0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     0. HRS
          N1 TURBINE OVERHAUL:                        0. HRS
          N2 TURBINE OVERHAUL:                        0. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***********************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   60.80   FINISH   58.28

      ATMOSPHERIC PRESSURE:              START   29.90   FINISH   30.02

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0087

      RELATIVE HUMIDITY:                     78.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    5.00

      SAMPLE LINE TRANSPORT TIME, SEC:    5.00

NUMBER OF TESTS:   4

COMMENTS:

 EXHAUST GAS PRESSURE IN INCHES HG.
 SMOKELESS REBUILT ENGINE.
 EPR OUT OF LIMITS (HIGH).


 CLOCK      TEST          POWER               ENGINE          MEASURED    GAS GEN     CALC     COMPRESSOR    ENGINE     TURBINE
 TIME       MODE    THRUST,LBS  PERCENT        SPEED            FUEL     AIR FLOW     F/A      DISCHARGE    PRESSURE     INLET
                        OR       RATED          RPM             FLOW      LB/SEC                 TEMP        RATIO       TEMP
                       SHP       T.O.      N1          N2       LB/HR                         DEGREES F       EPR     DEGREES F

 1001.00    1/ 0   10624.00       75    7293.00  10753.00    6142.00     -0.00   -0.000000      -0.00        1.73        -0.00
 1006.00    2/ 1   12004.00       85    7604.00  10980.00    6998.00     -0.00   -0.000000      -0.00        1.84        -0.00
 1010.00    3/ 2   13585.00       97    7983.00  11237.00    8089.00     -0.00   -0.000000      -0.00        1.98        -0.00
 1100.00    4/ 3    1010.00        7    2952.00   7143.00    1201.00     -0.00   -0.000000      -0.00       -0.00        -0.00


 POWER    EXHAUST      EXHAUST        CO        CO       THC      NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS          GAS        (WET)        2      (WET)    (WET)       2         X
 RATED     TEMP       PRESSURE       PPMV     (WET)     PPMV     PPMV     (WET)     (WET)
 T.O.   DEGREES F       PSIA                PERCENT V                      PPMV      PPMV

   75      870.80      51.80        45.00      2.30      1.20     74.00    -0.00     84.00     -0.00     -0.00      -0.00
   85      914.00      55.30        45.00      2.50      0.84     95.00    -0.00    103.00     -0.00     -0.00      -0.00
   97      969.80      59.30        45.00      2.80      0.90    118.00    -0.00    128.00     -0.00     -0.00      -0.00
    7      728.60      31.70       140.00      0.75     68.50      7.60    -0.00      8.00     -0.00     -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   75       3.92      0.06     -0.00   3149.56     10.59     12.02     24.09      0.37     -0.00  19344.61     65.06      73.86
   85       3.61      0.04     -0.00   3150.11     12.51     13.57     25.25      0.27     -0.00  22044.48     87.57      94.95
   97       3.22      0.04     -0.00   3150.72     13.88     15.06     26.07      0.30     -0.00  25486.20    112.28     121.80
    7      36.48     10.22     -0.00   3070.53      3.25      3.42     43.81     12.28     -0.00   3687.70      3.91       4.11


 POWER          CO                CO               THC                NO                NO                NO
PERCENT                            2                                                     2                 X
 RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

   75         2.267          1820.641             0.035             6.124            -0.000             6.952
   85         2.104          1836.428             0.022             7.295            -0.000             7.910
   97         1.919          1876.054             0.022             8.265            -0.000             8.966
    7        43.377          3651.192            12.155             3.868            -0.000             4.071
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     CAL ID NUMBER:  409   ENGINE TYPE AND MODEL: JT8D-7                SERIAL NUMBER:   648770
TEST ORGANIZATION:  UNITED/EPA


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO          FUEL     LB CO /      ENERGY    LB CO /
            POWER       # TH       RATE       RATE     WT FACTOR     MODE      MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.      LBS.         LBS.

TAXI-IDLE   0.060       840.0    33.699     915.873     1.000       19.00    10.671       290.03     36.795      266.00     0.04012
TAKEOFF     1.000     14000.0    23.861    8263.066     1.000        0.70     0.278        96.40      2.888      163.33     0.00170
CLIMBOUT    0.850     11900.0    23.952    6997.859     1.000        2.20     0.878       256.59      3.423      436.33     0.00201
APPROACH    0.400      5600.0    28.818    3337.709     1.000        4.00     1.921       222.51      8.634      373.33     0.00515
TAXI-IDLE   0.060       840.0    33.699     915.873     1.000        7.00     3.932       106.85     36.795       98.00     0.04012

                                 TOTAL FOR CYCLE:                            17.681       972.38                 1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             18.183
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            13.224
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           1.988


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC          FUEL     LB HC /      ENERGY    LB HC /
            POWER       # TH       RATE       RATE     WT FACTOR     MODE      MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.      LBS.         LBS.

TAXI-IDLE   0.060       840.0    10.976     915.873     1.000       19.00     3.476       290.03     11.984      266.00     0.01307
TAKEOFF     1.000     14000.0    0.0       8263.066     1.000        0.70     0.0          96.40      0.0        163.33     0.0
CLIMBOUT    0.850     11900.0     0.122    6997.859     1.000        2.20     0.004       256.59      0.018      436.33     0.00001
APPROACH    0.400      5600.0     1.750    3337.709     1.000        4.00     0.117       222.51      0.524      373.33     0.00031
TAXI-IDLE   0.060       840.0    10.976     915.873     1.000        7.00     1.280       106.85     11.984       98.00     0.01307

                                 TOTAL FOR CYCLE:                             4.877       972.38                 1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              5.016
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             3.648
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           0.0


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      NOX         FUEL     LB NOX/      ENERGY    LB NOX/
            POWER       # TH       RATE       RATE     WT FACTOR     MODE      MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.      LBS.         LBS.

TAXI-IDLE   0.060       840.0     2.421     915.873     1.000       19.00     0.767       290.03      2.643      266.00     0.00288
TAKEOFF     1.000     14000.0   130.025    8263.066     1.000        0.70     1.517        96.40     15.736      163.33     0.00929
CLIMBOUT    0.850     11900.0    94.019    6997.859     1.000        2.20     3.447       256.59     13.435      436.33     0.00790
APPROACH    0.400      5600.0    26.164    3337.709     1.000        4.00     1.744       222.51      7.839      373.33     0.00467
TAXI-IDLE   0.060       840.0     2.421     915.873     1.000        7.00     0.282       106.85      2.643       98.00     0.00288

                                 TOTAL FOR CYCLE:                             7.758       972.38                 1337.00
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              7.978
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             5.802
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         108.354
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DATE:   6/23/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:   87    ENGINE TYPE AND MODEL:  JT-8D-9S                     SERIAL NUMBER:   665397

                            RATED THRUST:         14500.

     ENGINE TOTAL TIME:                                   5469. HRS

     TIME SINCE HOT SECTION OVERHAUL:                        0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                            0. HRS
          N2 COMPRESSOR OVERHAUL:                            0. HRS
          COMBUSTOR CAN REPLACEMENT:                         0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:            0. HRS
          N1 TURBINE OVERHAUL:                               0. HRS
          N2 TURBINE OVERHAUL:                               0. HRS

     FUEL: JET - A               FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   65.00   FINISH   86.00

     ATMOSPHERIC PRESSURE:              START   14.35   FINISH   14.33

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0130

     RELATIVE HUMIDITY:                    52.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   16.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

H/C IS CAL-ESTIMATED
SMOKELESS ENGINE


  CLOCK      TEST          POWER                  ENGINE             MEASURED   GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
  TIME       MODE    THRUST,LBS  PERCENT          SPEED                FUEL     AIR FLOW     F/A      DISCHARGE    PRESSURE      INLET
                        OR       RATED             RPM                 FLOW     LB/SEC                  TEMP        RATIO        TEMP
                        SHP      T.O.         N1          N2          LB/HR                          DEGREES F       EPR      DEGREES F

 1135.00     1/ 0     880.00       6     2770.00     7060.00       1000.00     -0.00   -0.000000      -0.00        1.02        -0.00
 1150.00     2/ 1   10230.00      70     7360.00    11040.00       5820.00     -0.00   -0.000000      -0.00        2.09        -0.00
 1215.00     3/ 2   10800.00      74     7490.00    11160.00       6200.00     -0.00   -0.000000      -0.00        2.14        -0.00
 1225.00     4/ 3   11840.00      81     7720.00    11310.00       6880.00     -0.00   -0.000000      -0.00        2.28        -0.00
 1235.00     5/ 4   13610.00      93     8180.00    11620.00       8190.00     -0.00   -0.000000      -0.00        2.55        -0.00


  POWER    EXHAUST     EXHAUST        CO         CO        THC       NO        NO         NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS         (WET)        2       (WET)     (WET)       2          X
  RATED      TEMP      PRESSURE      PPMV       (WET)      PPMV      PPMV     (WET)      (WET)
  T.O.    DEGREES F      PSIA                 PERCENT V                       PPMV       PPMV

    6      765.00       15.30      137.00      1.02     108.00     17.40      6.00      23.40      4.39      -0.00      -0.00
   70      950.00       24.50       -0.00     -0.00      -0.00     -0.00     -0.00      -0.00     -0.00      -0.00      -0.00
   74      965.00       24.70       18.30      2.41      13.00     97.60      6.00     103.60     -0.00      -0.00      -0.00
   81     1000.00       25.90       18.30      2.67      14.70    121.00      8.00     129.00     -0.00      -0.00      -0.00
   93     1060.00       28.30       16.00      2.93      17.30    170.00     12.00     182.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    6       26.34     11.89      1.90   3081.87      5.50      7.39     26.34     11.89      1.90   3081.87      5.50      7.39
   70        0.20      0.12      0.33   3155.26      0.33      0.66      1.17      0.67      1.92  18363.61      1.92      3.84
   74        1.50      0.62      0.82   3151.84     13.34     14.16      9.29      3.84      5.09  19541.38     82.73     87.82
   81        1.35      0.63      0.99   3152.03     14.93     15.92      9.30      4.35      6.79  21685.95    102.74    109.53
   93        1.19      0.68      1.35   3152.31     19.12     20.47      9.97      5.56     11.05  25817.38    156.59    167.65


  POWER          CO                CO              THC               NO               NO              NO
 PERCENT                            2                                                  2                X
  RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

    6         29.937         3502.121           13.516            6.245            2.154            8.399
   70          0.114         1795.074            0.065            0.188            0.188            0.375
   74          0.860         1809.387            0.356            7.660            0.471            8.131
   81          0.796         1831.584            0.368            8.677            0.574            9.251
   93          0.659         1896.942            0.408           11.506            0.812           12.318
   CAL ID NUMBER:   87   ENGINE TYPE AND MODEL: JT-8D-9S                SERIAL NUMBER:  665397

TEST ORGANIZATION:  U.S. BUREAU OF MINES

                                                                                              LB CO /      ENERGY    LB CO /
                                                                                    FUEL                    
   MODE    FRACTIONAL    POWER    EMISSION    FUEL      USAGE     TIME IN    CO     MASS    1K LB FUEL   # TH-HR   # TH-HR
             POWER       # TH       RATE      RATE    WT FACTOR    MODE     MASS    LBS.
                                   LB/HR     LB/HR                 MIN.     LBS.

 TAXI-IDLE   0.060       870.0    24.495    975.771    1.000      19.00     7.757   308.99    25.103     275.50    0.02815
 TAKEOFF     1.000     14500.0     6.635   8812.832    1.000       0.70     0.077   102.82     0.753     169.17    0.00046
 CLIMBOUT    0.850     12325.0     8.388   7305.855    1.000       2.20     0.308   267.88     1.148     451.92    0.00068
 APPROACH    0.400      5800.0    18.596   3429.552    1.000       4.00     1.240   228.64     5.422     386.67    0.00321
 TAXI-IDLE   0.060       870.0    24.495    975.771    1.000       7.00     2.858   113.84    25.103     101.50    0.02815

                                 TOTAL FOR CYCLE:                          12.239  1022.17               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           11.974
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           8.838
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         0.534


                                                                                              LB HC /      ENERGY    LB HC /
   MODE    FRACTIONAL    POWER    EMISSION    FUEL      USAGE     TIME IN    HC     FUEL    1K LB FUEL   # TH-HR   # TH-HR
             POWER       # TH       RATE      RATE    WT FACTOR    MODE     MASS    MASS
                                   LB/HR     LB/HR                 MIN.     LBS.    LBS.

 TAXI-IDLE   0.060       870.0     9.883    975.771    1.000      19.00     3.130   308.99    10.129     275.50    0.01136
 TAKEOFF     1.000     14500.0     4.717   8812.832    1.000       0.70     0.055   102.82     0.535     169.17    0.00033
 CLIMBOUT    0.850     12325.0     4.513   7305.855    1.000       2.20     0.165   267.88     0.618     451.92    0.00037
 APPROACH    0.400      5800.0     3.514   3429.552    1.000       4.00     0.234   228.64     1.025     386.67    0.00061
 TAXI-IDLE   0.060       870.0     9.883    975.771    1.000       7.00     1.153   113.84    10.129     101.50    0.01136

                                 TOTAL FOR CYCLE:                           4.738  1022.17               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            4.635
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           3.421
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         3.795


                                                                                              LB NOX/      ENERGY    LB NOX/
   MODE    FRACTIONAL    POWER    EMISSION    FUEL      USAGE     TIME IN   NOX     FUEL    1K LB FUEL   # TH-HR   # TH-HR
             POWER       # TH       RATE      RATE    WT FACTOR    MODE     MASS    MASS
                                   LB/HR     LB/HR                 MIN.     LBS.    LBS.

 TAXI-IDLE   0.060       870.0     6.869    975.771    1.000      19.00     2.175   308.99     7.039     275.50    0.00790
 TAKEOFF     1.000     14500.0   207.454   8812.832    1.000       0.70     2.420   102.82    23.540     169.17    0.01431
 CLIMBOUT    0.850     12325.0   125.870   7305.855    1.000       2.20     4.615   267.88    17.229     451.92    0.01021
 APPROACH    0.400      5800.0    34.704   3429.552    1.000       4.00     2.314   228.64    10.119     386.67    0.00598
 TAXI-IDLE   0.060       870.0     6.869    975.771    1.000       7.00     0.801   113.84     7.039     101.50    0.00790

                                 TOTAL FOR CYCLE:                          12.326  1022.17               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           12.058
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           8.901
                                 LBS POLLUTANT/1000K LB TH AT T.O.:       166.917
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DATE:   7/22/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA ***********************************************************************************************************

     CAL ID NUMBER:  294    ENGINE TYPE AND MODEL:  JT-8D-9                      SERIAL NUMBER:   665314

                            RATED THRUST:          14500.

     ENGINE TOTAL TIME:                                   3385. HRS

     TIME SINCE HOT SECTION OVERHAUL:                        0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                            0. HRS
          N2 COMPRESSOR OVERHAUL:                            0. HRS
          COMBUSTOR CAN REPLACEMENT:                         0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:            0. HRS
          N1 TURBINE OVERHAUL:                               0. HRS
          N2 TURBINE OVERHAUL:                               0. HRS

     FUEL: JET - A                FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   83.00   FINISH   82.00

     ATMOSPHERIC PRESSURE:              START   29.20   FINISH   29.20

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0168

     RELATIVE HUMIDITY:                       65.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  130.00,  FLOW RATE, LITERS/MIN:   16.00

     SAMPLE LINE TRANSPORT TIME, SEC:    0.99

 NUMBER OF TESTS:   6

 COMMENTS:

  H/C IS-CAL ESTIMATED
  ENGINE RETURNED TO TEST AFTER REPAIR
  SAMPLE LINE TEMP. AVERAGED
 WITH RETROFIT


                                                                                                                  TURBINE
                                                                                        COMPRESSOR     ENGINE      INLET
                             POWER                ENGINE       MEASURED   GAS GEN    CALC   DISCHARGE    PRESSURE     TEMP
   CLOCK      TEST     THRUST,LBS  PERCENT         SPEED          FUEL    AIR FLOW   F/A       TEMP        RATIO    DEGREES F
   TIME       MODE         OR       RATED           RPM           FLOW     LB/SEC           DEGREES F      EPR
                          SHP       T.O.      N1          N2      LB/HR
                                                                                                            1.04      -0.00
   220.00     4/ 0       950.00        6    2880.00    7180.00   1147.00    -0.00   -0.000000    -0.00      1.73      -0.00
   240.00     5/ 4     10550.00       72    7430.00   11030.00   6220.00    -0.00   -0.000000    -0.00      1.04      -0.00
   250.00     4/ 5      1070.00        7    2990.00    7350.00   1090.00    -0.00   -0.000000    -0.00      1.75      -0.00
   255.00     1/ 4     10870.00       74    7500.00   11050.00   6440.00    -0.00   -0.000000    -0.00      1.86      -0.00
   300.00     2/ 1     11890.00       81    7748.00   11255.00   7130.00    -0.00   -0.000000    -0.00      2.02      -0.00
   305.00     3/ 2     13440.00       92    8150.00   11520.00   9290.00    -0.00   -0.000000    -0.00


                                                                 NO          NO      ALDEHYDES   SMOKE   PARTICULATES
   POWER     EXHAUST      EXHAUST         CO        CO       THC      NO       2           X
  PERCENT      GAS          GAS         (WET)       2      (WET)    (WET)    (WET)       (WET)
   RATED       TEMP      PRESSURE        PPMV     (WET)     PPMV     PPMV     PPMV        PPMV
   T.O.     DEGREES F      PSIA                 PERCENT V
                                                                                           -0.00      -0.00      -0.00
     6        745.00       14.88        131.00     0.78     56.20     2.90     4.00        6.90      0.23      -0.00      -0.00
    72        935.00       24.40         14.00     2.36      2.20    89.70    12.50      102.20      4.98      -0.00      -0.00
     7        715.00       14.88        120.00     0.80     58.30     3.40     5.00        8.40      0.23      -0.00      -0.00
    74        950.00       24.80         17.00     2.31      1.70   106.00    14.00      120.00      0.24      -0.00      -0.00
    81        975.00       26.70         16.50     2.46      1.70   117.20    14.00      131.20      0.39      -0.00      -0.00
    92       1030.00       28.50         16.00     2.72      1.30   157.20    16.00      173.20


   POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT      CO        HC        NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO        NOX
   RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
   T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL
                                                                        37.79      9.28      1.90   3534.96      1.37      3.27
     6       32.94      8.09      1.65   3081.92      1.20      2.85      9.52      0.67     10.86  19612.85     77.93     38.79
    72        1.53      0.11      1.75   3153.19     12.53     14.27     32.12      8.94      2.20   3364.92      1.50      3.69
     7       29.47      8.20      2.02   3087.09      1.37      3.39      9.51      0.54     12.87  20307.48     97.42    110.28
    74        1.48      0.08      2.00   3153.34     15.13     17.12      9.60      0.57     13.38  22484.84    111.99    125.36
    81        1.35      0.08      1.84   3153.56     15.71     17.58      9.79      0.46     16.08  26145.70    157.97    174.04
    92        1.18      0.05      1.94   3153.88     19.06     20.99


                                                                                       NO                NO
   POWER          CO                CO               THC              NO                2                 X
  PERCENT                            2
   RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
   T.O.
                                                                                      1.995              3.441
     6          39.774          3721.014            9.773           1.446             1.029              8.416
    72           0.902          1859.038            0.063           7.387             2.055              3.452
     7          30.022          3144.786            8.354           1.397             1.184             10.146
    74           0.875          1868.214            0.050           8.962             1.125             10.544
    81           0.807          1891.072            0.048           9.419             1.196             12.950
    92           0.728          1945.364            0.034          11.753
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     CAL ID NUMBER:  294   ENGINE TYPE AND MODEL: JT-8D-9                SERIAL NUMBER:  665314

TEST ORGANIZATION:  U.S. BUREAU OF MINES

   MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN      CO         FUEL     LB CO /      ENERGY    LB CO /
             POWER        # TH       RATE       RATE      WT FACTOR    MODE       MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR      LB/HR                   MIN.       LBS.        LBS.

TAXI-IDLE    0.060       870.0     31.159     977.719     1.000       19.00      9.867      309.61      31.869     275.50     0.03581
TAKEOFF      1.000     14500.0      9.124    9143.723     1.000        0.70      0.106      106.68       0.998     169.17     0.00063
CLIMBOUT     0.850     12325.0      9.803    7595.383     1.000        2.20      0.359      278.50       1.291     451.92     0.00080
APPROACH     0.400      5800.0     21.674    3624.235     1.000        4.00      1.445      241.62       5.980     386.67     0.00374
TAXI-IDLE    0.060       870.0     31.159     977.719     1.000        7.00      3.635      114.07      31.869     101.50     0.03581

                              TOTAL FOR CYCLE:                                  15.413     1050.47                 1384.75
                              LBS POLLUTANT/1K LB FUEL/CYCLE:                   14.673
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:                  11.131
                              LBS POLLUTANT/1000K LB TH AT T.O.:                 0.734


   MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN      HC         FUEL     LB HC /      ENERGY    LB HC /
             POWER        # TH       RATE       RATE      WT FACTOR    MODE       MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR      LB/HR                   MIN.       LBS.        LBS.

TAXI-IDLE    0.060       870.0      8.384     977.719     1.000       19.00      2.655      309.61       8.575     275.50     0.00964
TAKEOFF      1.000     14500.0      0.0      9143.723     1.000        0.70      0.0        106.68       0.0       169.17     0.0
CLIMBOUT     0.850     12325.0      0.456    7595.383     1.000        2.20      0.017      278.50       0.060     451.92     0.00004
APPROACH     0.400      5800.0      2.690    3624.235     1.000        4.00      0.179      241.62       0.742     386.67     0.00046
TAXI-IDLE    0.060       870.0      8.384     977.719     1.000        7.00      0.978      114.07       8.575     101.50     0.00964

                              TOTAL FOR CYCLE:                                   3.829     1050.47                 1384.75
                              LBS POLLUTANT/1K LB FUEL/CYCLE:                    3.645
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:                   2.765
                              LBS POLLUTANT/1000K LB TH AT T.O.:                 0.0


   MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN     NOX         FUEL     LB NOX/      ENERGY    LB NOX/
             POWER        # TH       RATE       RATE      WT FACTOR    MODE       MASS        MASS    1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR      LB/HR                   MIN.       LBS.        LBS.

TAXI-IDLE    0.060       870.0      2.888     977.719     1.000       19.00      0.914      309.61       2.953     275.50     0.00332
TAKEOFF      1.000     14500.0    222.620    9143.723     1.000        0.70      2.597      106.68      24.347     169.17     0.01535
CLIMBOUT     0.850     12325.0    140.248    7595.383     1.000        2.20      5.142      278.50      18.465     451.92     0.01138
APPROACH     0.400      5800.0     34.118    3624.235     1.000        4.00      2.275      241.62       9.414     386.67     0.00588
TAXI-IDLE    0.060       870.0      2.888     977.719     1.000        7.00      0.337      114.07       2.953     101.50     0.00332

                              TOTAL FOR CYCLE:                                  11.265     1050.47                 1384.75
                              LBS POLLUTANT/1K LB FUEL/CYCLE:                   10.724
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:                   8.135
                              LBS POLLUTANT/1000K LB TH AT T.O.:               179.119
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DATE:   7/27/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA ************************************************************************************************

    CAL ID NUMBER:  349    ENGINE TYPE AND MODEL:  JT-8D-9                  SERIAL NUMBER:   665401

                          RATED THRUST:        14500.

     ENGINE TOTAL TIME:                                5500. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         0. HRS
          N2 COMPRESSOR OVERHAUL:                         0. HRS
          COMBUSTOR CAN REPLACEMENT:                     -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
          N1 TURBINE OVERHAUL:                         6681. HRS
          N2 TURBINE OVERHAUL:                         7641. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ****************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   79.00   FINISH   81.00

      ATMOSPHERIC PRESSURE:              START   29.30   FINISH   29.30

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0153

      RELATIVE HUMIDITY:                   67.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  135.00,  FLOW RATE, LITERS/MIN:   16.00

      SAMPLE LINE TRANSPORT TIME, SEC:    0.99

NUMBER OF TESTS:   5

COMMENTS:

H/C CAL ESTIMATED SAMPLE LINE TEMP AVERAGED WITH RETROFIT


                                                                                                   COMPRESSOR     ENGINE      TURBINE
                                              ENGINE           MEASURED    GAS GEN      CALC       DISCHARGE     PRESSURE      INLET
 CLOCK       TEST          POWER               SPEED             FUEL      AIR FLOW      F/A          TEMP         RATIO        TEMP
 TIME        MODE     THRUST,LBS  PERCENT      RPM               FLOW      LB/SEC                  DEGREES F       EPR      DEGREES F
                          OR       RATED                         LB/HR
                         SHP       T.O.      N1        N2

1200.00      5/ 0     10900.00      75    7440.00  11145.00    6210.00      -0.00   -0.000000       -0.00         1.75        -0.00
1210.00      4/ 5       990.00       6    2890.00   7180.00     970.00      -0.00   -0.000000       -0.00         1.05        -0.00
1220.00      1/ 4     10900.00      75    7500.00  11160.00    6220.00      -0.00   -0.000000       -0.00         1.76        -0.00
1230.00      2/ 1     12000.00      82    7730.00  11350.00    6880.00      -0.00   -0.000000       -0.00         1.85        -0.00
1235.00      3/ 2     13720.00      94    8150.00  11620.00    8110.00      -0.00   -0.000000       -0.00         2.02        -0.00


                                                                                    NO        NO     ALDEHYDES    SMOKE    PARTICULATES
 POWER    EXHAUST      EXHAUST        CO         CO        THC       NO             2         X
PERCENT     GAS          GAS         (WET)        2       (WET)     (WET)         (WET)     (WET)
 RATED      TEMP       PRESSURE      PPMV       (WET)      PPMV      PPMV          PPMV      PPMV
 T.O.    DEGREES F       PSIA                 PERCENT V

  75       930.00       24.78        19.20       2.33      1.50     83.00        17.00     100.00      0.19      -0.00       -0.00
   6       690.00       15.02       107.00       0.77     51.80      1.90         6.00       7.90      4.34      -0.00       -0.00
  75       935.00       24.94        19.60       2.39      2.60     85.60        18.00     103.60      0.17      -0.00       -0.00
  82       970.00       26.17        19.40       2.57      2.20    103.40        20.00     123.40      0.19      -0.00       -0.00
  94      1035.00       28.53        19.20       2.88      2.20    149.30        21.00     170.30      0.27      -0.00       -0.00


                                                                                             MASS EMI   MASS EMI   MASS EMI   MASS EMI
 POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI     NO2        CO2         NO        NOX
PERCENT      CO         HC         NO2        CO2         NO        NOX         CO         HC       LB/HR      LB/HR      LB/HR      LB/HR
 RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR
 T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

  75        1.65       0.07       2.40     3153.09      11.74      14.15      10.27       0.46      14.93   19580.67      72.92      87.85
   6       27.35       7.58       2.52     3092.12       0.80       3.32      26.53       7.35       2.44    2999.35       0.77       3.22
  75        1.65       0.13       2.48     3152.96      11.81      14.29      10.24       0.78      15.44   19611.41      73.43      88.87
  82        1.51       0.10       2.57     3153.24      13.26      15.83      10.42       0.68      17.65   21694.28      91.25     108.90
  94        1.34       0.09       2.40     3153.55      17.09      19.49      10.85       0.71      19.50   25575.25     138.60     158.10


                                                                                       NO                 NO
 POWER          CO               CO               THC              NO                  2                  X
PERCENT                           2
 RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR       LB/1K#TH-HR        LB/1K#TH-HR
 T.O.

  75          0.942         1796.392            0.042             6.690             1.370              8.060
   6         26.795         3029.651            7.429             0.782             2.468              3.249
  75          0.939         1799.212            0.071             6.737             1.417              8.153
  82          0.869         1807.857            0.056             7.604             1.471              9.075
  94          0.791         1864.085            0.052            10.102             1.421             11.523
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   CAL ID NUMBER:  349   ENGINE TYPE AND MODEL: JT-8D-9                SERIAL NUMBER:  665401

TEST ORGANIZATION:  U.S. BUREAU OF MINES

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /    ENERGY    LB CO /
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060       870.0    25.624    926.992     1.000      19.00      8.114     293.55     27.642    275.50    0.02945
TAKEOFF     1.000     14500.0     9.533   8704.117     1.000       0.70      0.111     101.55      1.095    169.17    0.00066
CLIMBOUT    0.850     12325.0     9.460   7330.152     1.000       2.20      0.347     268.77      1.291    451.92    0.00077
APPROACH    0.400      5800.0    13.590   3208.258     1.000       4.00      0.906     213.88      4.236    386.67    0.00234
TAXI-IDLE   0.060       870.0    25.624    926.992     1.000       7.00      2.989     108.15     27.642    101.50    0.02945

                                 TOTAL FOR CYCLE:                           12.468     985.90               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            12.646
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            9.004
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          0.767


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /    ENERGY    LB HC /
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060       870.0     7.310    926.992     1.000      19.00      2.315     293.55      7.886    275.50    0.00840
TAKEOFF     1.000     14500.0     0.339   8704.117     1.000       0.70      0.004     101.55      0.039    169.17    0.00002
CLIMBOUT    0.850     12325.0     0.459   7330.152     1.000       2.20      0.017     268.77      0.063    451.92    0.00004
APPROACH    0.400      5800.0     2.109   3208.258     1.000       4.00      0.141     213.88      0.657    386.67    0.00036
TAXI-IDLE   0.060       870.0     7.310    926.992     1.000       7.00      0.853     108.15      7.886    101.50    0.00840

                                 TOTAL FOR CYCLE:                            3.329     985.90               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             3.377
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            2.404
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          0.273


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/    ENERGY    LB NOX/
            POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060       870.0     2.786    926.992     1.000      19.00      0.882     293.55      3.006    275.50    0.00320
TAKEOFF     1.000     14500.0   183.927   8704.117     1.000       0.70      2.146     101.55     21.131    169.17    0.01268
CLIMBOUT    0.850     12325.0   122.037   7330.152     1.000       2.20      4.475     268.77     16.649    451.92    0.00990
APPROACH    0.400      5800.0    31.081   3208.258     1.000       4.00      2.072     213.88      9.688    386.67    0.00536
TAXI-IDLE   0.060       870.0     2.786    926.992     1.000       7.00      0.325     108.15      3.006    101.50    0.00320

                                 TOTAL FOR CYCLE:                            9.900     985.90               1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            10.042
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            7.149
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        147.987
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DATE: 7/26/71

TEST ORGANIZATION: U.S. BUREAU OF MINES

ENGINE SUPPLIER: AMERICAN AIRLINES

ENGINE DATA **

CAL ID NUMBER: 350 ENGINE TYPE AND MODEL: JT-8D-9 SERIAL NUMBER: 665166

RATED THRUST: 14500.

ENGINE TOTAL TIME: 7361. HRS

TIME SINCE HOT SECTION OVERHAUL: 1986. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	2853. HRS
N2 COMPRESSOR OVERHAUL:	3894. HRS
COMBUSTOR CAN REPLACEMENT:	1986. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	1986. HRS
N1 TURBINE OVERHAUL:	5001. HRS
N2 TURBINE OVERHAUL:	5372. HRS

FUEL: JET - A FUEL H/C RATIO: 1.920

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 72.00 FINISH 72.00

ATMOSPHERIC PRESSURE: START 29.30 FINISH 29.30

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0130

RELATIVE HUMIDITY: 76.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 139.00, FLOW RATE, LITERS/MIN: 16.00

SAMPLE LINE TRANSPORT TIME, SEC: 0.99

NUMBER OF TESTS: 6

COMMENTS:

H/C CAL ESTIMATED SAMPLE LINE TEMP. AVERAGED WITH RETROFIT FIRST IDLE MODE
UNTRIMMED

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
125.00	4/ 0	960.00	6	2860.00	6950.00	1110.00	-0.00	-0.000000	-0.00	1.04	-0.00
135.00	5/ 4	10400.00	71	7360.00	11000.00	6100.00	-0.00	-0.000000	-0.00	1.72	-0.00
140.00	4/ 5	1020.00	7	2900.00	7060.00	1040.00	-0.00	-0.000000	-0.00	1.04	-0.00
150.00	1/ 4	10900.00	75	7430.0C	10900.00	6330.00	288.00	-0.000000	-0.00	1.76	-0.00
155.00	2/ 1	12000.00	82	7670.0C	11130.00	6960.00	300.00	-0.000000	-0.00	1.85	-0.00
200.00	3/ 2	13700.00	94	8110.00	11410.00	8210.00	314.00	-0.000000	-0.00	2.03	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
6	725.00	14.99	151.00	0.77	95.00	3.10	4.00	7.10	-0.00	-0.00	-0.00
71	935.00	24.40	23.00	2.42	3.90	82.10	16.00	98.10	0.25	-0.00	-0.00
7	725.00	14.99	158.00	0.82	90.70	7.30	7.50	14.80	7.14	-0.00	-0.00
75	935.00	25.04	22.50	2.44	2.40	43.30	19.00	62.30	0.23	-0.00	-0.00
82	960.00	26.35	20.50	2.62	2.20	69.30	19.00	88.30	0.24	-0.00	-0.00
94	1020.00	28.70	19.[illegible]	2.93	2.20	70.00	21.00	91.00	0.36	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
6	38.17	13.75	1.66	3058.18	1.29	2.95	42.37	15.27	1.84	3394.58	1.43	3.27
71	1.91	0.19	2.19	3152.39	11.18	13.36	11.63	1.13	13.29	19229.55	68.20	81.49
7	37.56	12.35	2.93	3062.99	2.85	5.78	39.06	12.84	3.05	3185.51	2.96	6.01
75	1.85	0.11	2.57	3152.67	5.85	8.42	11.71	0.72	16.25	19956.41	37.02	53.27
82	1.57	0.10	2.39	3153.16	8.72	11.11	10.93	0.67	16.64	21945.97	60.68	77.32
94	1.34	0.09	2.36	3153.55	7.88	10.24	10.97	0.71	19.40	25890.67	64.66	84.06

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_x LB/1K#TH-HR
6	44.133	3536.025	15.902	1.488	1.920	3.409
71	1.118	1848.996	0.109	6.558	1.278	7.836
7	38.299	3123.049	12.592	2.906	2.986	5.893
75	1.075	1830.863	0.066	3.397	1.490	4.887
82	0.911	1828.831	0.056	5.057	1.386	6.443
94	0.800	1889.830	0.052	4.720	1.416	6.136

CAL ID NUMBER: 350 ENGINE TYPE AND MODEL: JT-8D-9 SERIAL NUMBER: 665166

TEST ORGANIZATION: U.S. BUREAU OF MINES

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	CO MASS LBS.	FUEL MASS LBS.	LB CO / 1K LB FUEL	ENERGY # TH-HR	LB CO / # TH-HR
TAXI-IDLE	0.060	870.0	33.870	924.888	1.000	19.00	10.726	292.88	36.621	275.50	0.03893
TAKEOFF	1.000	14500.0	7.052	8801.363	1.000	0.70	0.082	102.68	0.801	169.17	0.00049
CLIMBOUT	0.850	12325.0	9.806	7399.922	1.000	2.20	0.360	271.33	1.325	451.92	0.00080
APPROACH	0.400	5800.0	19.023	3254.844	1.000	4.00	1.268	216.99	5.845	386.67	0.00328
TAXI-IDLE	0.060	870.0	33.870	924.888	1.000	7.00	3.952	107.90	36.621	101.50	0.03893
TOTAL FOR CYCLE:							16.387	991.79		1384.75	
LBS POLLUTANT/1K LB FUEL/CYCLE:							16.523				
LBS POLLUTANT/1K LB TH-HR/CYCLE:							11.834				
LBS POLLUTANT/1000K LB TH AT T.O.:							0.567				

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	HC MASS LBS.	FUEL MASS LBS.	LB HC / 1K LB FUEL	ENERGY # TH-HR	LB HC / # TH-HR
TAXI-IDLE	0.060	870.0	12.377	924.888	1.000	19.00	3.919	292.88	13.382	275.50	0.01423
TAKEOFF	1.000	14500.0	0.187	8801.363	1.000	0.70	0.002	102.68	0.021	169.17	0.00001
CLIMBOUT	0.850	12325.0	0.964	7399.922	1.000	2.20	0.035	271.33	0.130	451.92	0.00008
APPROACH	0.400	5800.0	3.592	3254.844	1.000	4.00	0.239	216.99	1.103	386.67	0.00062
TAXI-IDLE	0.060	870.0	12.377	924.888	1.000	7.00	1.444	107.90	13.382	101.50	0.01423
TOTAL FOR CYCLE:							5.640	991.79		1384.75	
LBS POLLUTANT/1K LB FUEL/CYCLE:							5.687				
LBS POLLUTANT/1K LB TH-HR/CYCLE:							4.073				
LBS POLLUTANT/1000K LB TH AT T.O.:							0.151				

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	NOX MASS LBS.	FUEL MASS LBS.	LB NOX/ 1K LB FUEL	ENERGY # TH-HR	LB NOX/ # TH-HR
TAXI-IDLE	0.060	870.0	2.642	924.888	1.000	19.00	0.836	292.88	2.856	275.50	0.00304
TAKEOFF	1.000	14500.0	123.275	8801.363	1.000	0.70	1.438	102.68	14.006	169.17	0.00850
CLIMBOUT	0.850	12325.0	85.889	7399.922	1.000	2.20	3.149	271.33	11.607	451.92	0.00697
APPROACH	0.400	5800.0	22.374	3254.844	1.000	4.00	1.492	216.99	6.874	386.67	0.00386
TAXI-IDLE	0.060	870.0	2.642	924.888	1.000	7.00	0.308	107.90	2.856	101.50	0.00304
TOTAL FOR CYCLE:							7.224	991.79		1384.75	
LBS POLLUTANT/1K LB FUEL/CYCLE:							7.284				
LBS POLLUTANT/1K LB TH-HR/CYCLE:							5.217				
LBS POLLUTANT/1000K LB TH AT T.O.:							99.187				

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DATE:   7/28/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA ***********************************************************************************************************

     CAL ID NUMBER:  351    ENGINE TYPE AND MODEL:  JT-8D-9                     SERIAL NUMBER:   665359

                            RATED THRUST:         14500.

     ENGINE TOTAL TIME:                                  6077. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        6077. HRS
          N2 COMPRESSOR OVERHAUL:                          0. HRS
          COMBUSTOR CAN REPLACEMENT:                       0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
          N1 TURBINE OVERHAUL:                           6077. HRS
          N2 TURBINE OVERHAUL:                             0. HRS

     FUEL: JET - A               FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   81.00   FINISH   -0.00

     ATMOSPHERIC PRESSURE:              START   29.29   FINISH   29.29

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0180

     RELATIVE HUMIDITY:                    76.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  143.00,  FLOW RATE, LITERS/MIN:   16.00

     SAMPLE LINE TRANSPORT TIME, SEC:    0.99

NUMBER OF TESTS:   5

COMMENTS:

H/C CAL ESTIMATED SAMPLE LINE TEMP. AVERAGED USED C-ARMED PROBE APPROX. 6 INCHES
FROM TAILPIPE. WITH RETROFIT


 CLOCK      TEST          POWER                ENGINE           MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE     TURBINE
 TIME       MODE    THRUST,LBS  PERCENT        SPEED              FUEL     AIR FLOW     F/A     DISCHARGE    PRESSURE     INLET
                       OR        RATED          RPM               FLOW     LB/SEC                 TEMP        RATIO       TEMP
                      SHP        T.O.      N1          N2         LB/HR                         DEGREES F      EPR      DEGREES F

 610.00     5/ 0    10750.00      74     7450.00  11040.00       6220.00    -0.00   -0.000000     -0.00        1.74       -0.00
 620.00     4/ 5     1000.00       6     2900.00   7200.00       1020.00    -0.00   -0.000000     -0.00        1.03       -0.00
 625.00     1/ 4    10900.00      75     7480.00  11040.00       6340.00    -0.00   -0.000000     -0.00        1.76       -0.00
 630.00     2/ 1    12000.00      82     7730.00  11260.00       6970.00    -0.00   -0.000000     -0.00        1.87       -0.00
 630.00     3/ 2    13560.00      93     8130.00  11510.00       8110.00    -0.00   -0.000000     -0.00        2.00       -0.00


 POWER     EXHAUST      EXHAUST         CO         CO       THC      NO        NO         NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT      GAS          GAS          (WET)        2      (WET)    (WET)       2          X
 RATED      TEMP        PRESSURE       PPMV       (WET)    PPMV     PPMV      (WET)      (WET)
 T.O.    DEGREES F        PSIA                  PERCENT V                      PPMV       PPMV

  74       950.00        24.68        19.00      2.24      2.40     84.20     7.50      91.70     -0.00      -0.00      -0.00
   6       700.00        14.87       105.00      0.85     33.70      3.30     4.50       7.80     -0.00      -0.00      -0.00
  75       955.00        24.90        17.50      2.26      2.60     87.80     8.50      96.30     -0.00      -0.00      -0.00
  82       930.00        26.43        16.50      2.34      2.40    108.60     9.50     118.10     -0.00      -0.00      -0.00
  93      1100.00        28.38        16.00      2.57      2.40    142.40    10.00     152.40     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  74        1.70      0.12      1.10   3152.88     12.39     13.49     10.59      0.77      6.86  19610.89     77.06     83.93
   6       24.41      4.49      1.72   3105.22      1.26      2.98     24.90      4.58      1.75   3167.32      1.29      3.04
  75        1.55      0.13      1.24   3153.08     12.81     14.05      9.85      0.84      7.86  19990.55     81.19     89.05
  82        1.42      0.12      1.34   3153.34     15.33     16.64      9.86      0.82      9.33  21978.79    106.64    115.96
  93        1.25      0.11      1.28   3153.63     18.27     19.55     10.15      0.87     10.40  25575.96    148.15    158.55


 POWER          CO                CO               THC               NO                NO                NO
PERCENT                            2                                                    2                 X
 RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

  74          0.985          1824.269            0.071             7.169             0.639             7.807
   6         24.901          3167.322            4.577             1.285             1.753             3.038
  75          0.904          1833.996            0.077             7.448             0.721             8.170
  82          0.822          1831.566            0.068             8.886             0.777             9.664
  93          0.746          1883.355            0.064            10.909             0.766            11.675
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CAL ID NUMBER: 351 ENGINE TYPE AND MODEL: JT-8D-9 SERIAL NUMBER: 665359

TEST ORGANIZATION: U.S. BUREAU OF MINES

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	CO MASS LBS.	FUEL MASS LBS.	LB CO / 1K LB FUEL	ENERGY # TH-HR	LB CO / # TH-HR
TAXI-IDLE	0.060	870.0	22.924	928.453	1.000	19.00	7.259	294.01	24.691	275.50	0.02635
TAKEOFF	1.000	14500.0	9.152	8717.707	1.000	0.70	0.107	101.71	1.050	169.17	0.00063
CLIMBOUT	0.850	12325.0	9.858	7391.855	1.000	2.20	0.361	271.03	1.334	451.92	0.00080
APPROACH	0.400	5800.0	17.288	3508.787	1.000	4.00	1.153	233.92	4.927	386.67	0.00298
TAXI-IDLE	0.060	870.0	22.924	928.453	1.000	7.00	2.674	108.32	24.691	101.50	0.02635

TOTAL FOR CYCLE: 11.554 1008.99 1384.75
LBS POLLUTANT/1K LB FUEL/CYCLE: 11.452
LBS POLLUTANT/1K LB TH-HR/CYCLE: 8.344
LBS POLLUTANT/1000K LB TH AT T.O.: 0.736

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	HC MASS LBS.	FUEL MASS LBS.	LB HC / 1K LB FUEL	ENERGY # TH-HR	LB HC / # TH-HR
TAXI-IDLE	0.060	870.0	4.090	928.453	1.000	19.00	1.295	294.01	4.405	275.50	0.00470
TAKEOFF	1.000	14500.0	0.566	8717.707	1.000	0.70	0.007	101.71	0.065	169.17	0.00004
CLIMBOUT	0.850	12325.0	0.761	7391.855	1.000	2.20	0.028	271.03	0.103	451.92	0.00006
APPROACH	0.400	5800.0	1.454	3508.787	1.000	4.00	0.097	233.92	0.414	386.67	0.00025
TAXI-IDLE	0.060	870.0	4.090	928.453	1.000	7.00	0.477	108.32	4.405	101.50	0.00470

TOTAL FOR CYCLE: 1.904 1008.99 1384.75
LBS POLLUTANT/1K LB FUEL/CYCLE: 1.887
LBS POLLUTANT/1K LB TH-HR/CYCLE: 1.375
LBS POLLUTANT/1000K LB TH AT T.O.: 0.456

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	NOX MASS LBS.	FUEL MASS LBS.	LB NOX/ 1K LB FUEL	ENERGY # TH-HR	LB NOX/ # TH-HR
TAXI-IDLE	0.060	870.0	2.611	928.453	1.000	19.00	0.827	294.01	2.812	275.50	0.00300
TAKEOFF	1.000	14500.0	191.204	8717.707	1.000	0.70	2.231	101.71	21.933	169.17	0.01319
CLIMBOUT	0.850	12325.0	125.976	7391.855	1.000	2.20	4.619	271.03	17.043	451.92	0.01022
APPROACH	0.400	5800.0	25.844	3508.787	1.000	4.00	1.723	233.92	7.366	386.67	0.00446
TAXI-IDLE	0.060	870.0	2.611	928.453	1.000	7.00	0.305	108.32	2.812	101.50	0.00300

TOTAL FOR CYCLE: 9.704 1008.99 1384.75
LBS POLLUTANT/1K LB FUEL/CYCLE: 9.618
LBS POLLUTANT/1K LB TH-HR/CYCLE: 7.008
LBS POLLUTANT/1000K LB TH AT T.O.: 153.842

DATE: 7/20/71

TEST ORGANIZATION: PRATT & WHITNEY

ENGINE SUPPLIER: PRATT AND WHITNEY

ENGINE DATA **

CAL ID NUMBER: 352 ENGINE TYPE AND MODEL: JT-8D-9 SERIAL NUMBER: P-665709

RATED THRUST: 14500.

ENGINE TOTAL TIME: -0. HRS

TIME SINCE HOT SECTION OVERHAUL: -0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: -0. HRS
N2 COMPRESSOR OVERHAUL: -0. HRS
COMBUSTOR CAN REPLACEMENT: -0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: -0. HRS
N1 TURBINE OVERHAUL: -0. HRS
N2 TURBINE OVERHAUL: -0. HRS

FUEL: JP-4 FUEL H/C RATIO: 2.000

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 72.00 FINISH 77.00

ATMOSPHERIC PRESSURE: START 29.79 FINISH 29.79

INLET AIR HUMIDITY, LBS H2O/LB AIR: -0.0000

RELATIVE HUMIDITY: -0.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.0C, FLOW RATE, LITERS/MIN: 2.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 6

COMMENTS:

EXHAUST GAS PRESSURE IN INCHES HG
SMOKE DENSITY IS VON BRAND MEASURE PARTICULATES ARE IN MG/M**3

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1141.00	1/ 0	5000.00	34	5710.00	9790.00	2843.00	82.80	0.009500	-0.00	1.30	-0.00
1243.00	4/ 1	9450.00	65	7090.00	10810.00	5250.00	120.70	0.012100	-0.00	1.63	-0.00
1258.00	5/ 4	10770.00	74	7395.00	11030.00	6035.00	128.90	0.013000	-0.00	1.74	-0.00
1311.00	6/ 5	11850.00	81	7655.00	11205.00	6675.00	136.10	0.013600	-0.00	1.84	-0.00
1328.00	7/ 6	13600.00	93	8125.00	11525.00	8000.00	149.90	0.014800	-0.00	2.02	-0.00
1350.00	8/ 7	780.00	5	2530.00	6530.00	908.00	28.80	0.008800	-0.00	1.04	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO 2 (WET) PPMV	NO X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
34	695.00	38.32	47.10	1.42	4.80	29.80	9.90	39.70	-0.00	16.00	-0.00
65	835.00	47.98	17.50	2.10	3.60	78.60	10.80	89.40	-0.00	24.00	-0.00
74	885.00	51.16	14.60	2.23	0.50	98.20	9.80	108.00	-0.00	25.00	13.00
81	915.00	53.97	12.60	2.46	1.30	120.50	9.10	129.60	-0.00	26.00	13.00
93	985.00	58.84	10.60	2.68	2.00	168.30	10.80	179.10	-0.00	27.00	14.00
5	710.00	30.89	197.20	1.00	64.50	5.10	6.70	11.80	-0.00	2.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
34	6.60	0.39	2.28	3126.32	6.86	9.14	18.76	1.10	6.48	8888.12	19.50	25.98
65	1.66	0.20	1.69	3134.60	12.26	13.95	8.73	1.03	8.85	16456.63	64.39	73.24
74	1.31	0.03	1.44	3135.62	14.43	15.88	7.89	0.15	8.69	18923.48	87.11	95.81
81	1.02	0.06	1.21	3135.97	16.06	17.27	6.82	0.40	8.09	20932.61	107.19	115.29
93	0.79	0.09	1.32	3136.27	20.59	21.91	6.32	0.68	10.57	25090.16	164.72	175.29
5	38.38	7.19	2.14	3057.73	1.63	3.77	34.85	6.53	1.94	2776.47	1.48	3.42

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO 2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO 2 LB/1K#TH-HR	NO X LB/1K#TH-HR
34	3.753	1777.625	0.219	3.900	1.296	5.195
65	0.924	1741.442	0.109	6.814	0.936	7.750
74	0.732	1757.055	0.014	8.089	0.807	8.896
81	0.576	1766.465	0.034	9.046	0.683	9.729
93	0.464	1844.865	0.050	12.111	0.777	12.889
5	44.674	3559.506	8.369	1.898	2.493	4.391

CAL ID NUMBER: 352   ENGINE TYPE AND MODEL: JT-8D-9   SERIAL NUMBER: P-665709

TEST ORGANIZATION: PRATT & WHITNEY

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	CO MASS LBS.	FUEL MASS LBS.	LB CO / 1K LB FUEL	ENERGY # TH-HR	LB CO / # TH-HR
TAXI-IDLE	0.060	870.0	31.939	980.839	1.000	19.00	10.114	310.60	32.563	275.50	0.03671
TAKEOFF	1.000	14500.0	2.953	8565.398	1.000	0.70	0.034	99.93	0.345	169.17	0.00020
CLIMBOUT	0.850	12325.0	5.316	7193.688	1.000	2.20	0.195	263.77	0.739	451.92	0.00043
APPROACH	0.400	5800.0	15.963	3251.086	1.000	4.00	1.064	216.74	4.910	386.67	0.00275
TAXI-IDLE	0.060	870.0	31.939	980.839	1.000	7.00	3.726	114.43	32.563	101.50	0.03671
TOTAL FOR CYCLE:							15.134	1005.47		1384.75	
LBS POLLUTANT/1K LB FUEL/CYCLE:							15.051				
LBS POLLUTANT/1K LB TH-HR/CYCLE:							10.929				
LBS POLLUTANT/1000K LB TH AT T.O.:							0.238				

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	HC MASS LBS.	FUEL MASS LBS.	LB HC / 1K LB FUEL	ENERGY # TH-HR	LB HC / # TH-HR
TAXI-IDLE	0.060	870.0	5.838	980.839	1.000	19.00	1.849	310.60	5.952	275.50	0.00671
TAKEOFF	1.000	14500.0	0.463	8565.398	1.000	0.70	0.005	99.93	0.054	169.17	0.00003
CLIMBOUT	0.850	12325.0	0.624	7193.688	1.000	2.20	0.023	263.77	0.087	451.92	0.00005
APPROACH	0.400	5800.0	1.095	3251.086	1.000	4.00	0.073	216.74	0.337	386.67	0.00019
TAXI-IDLE	0.060	870.0	5.838	980.839	1.000	7.00	0.681	114.43	5.952	101.50	0.00671
TOTAL FOR CYCLE:							2.631	1005.47		1384.75	
LBS POLLUTANT/1K LB FUEL/CYCLE:							2.617				
LBS POLLUTANT/1K LB TH-HR/CYCLE:							1.900				
LBS POLLUTANT/1000K LB TH AT T.O.:							0.373				

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	NOX MASS LBS.	FUEL MASS LBS.	LB NOX/ 1K LB FUEL	ENERGY # TH-HR	LB NOX/ # TH-HR
TAXI-IDLE	0.060	870.0	3.861	980.839	1.000	19.00	1.223	310.60	3.936	275.50	0.00444
TAKEOFF	1.000	14500.0	213.495	8565.398	1.000	0.70	2.491	99.93	24.925	169.17	0.01472
CLIMBOUT	0.850	12325.0	133.188	7193.688	1.000	2.20	4.884	263.77	18.515	451.92	0.01081
APPROACH	0.400	5800.0	32.191	3251.086	1.000	4.00	2.146	216.74	9.902	386.67	0.00555
TAXI-IDLE	0.060	870.0	3.861	980.839	1.000	7.00	0.450	114.43	3.936	101.50	0.00444
TOTAL FOR CYCLE:							11.193	1005.47		1384.75	
LBS POLLUTANT/1K LB FUEL/CYCLE:							11.133				
LBS POLLUTANT/1K LB TH-HR/CYCLE:							8.083				
LBS POLLUTANT/1000K LB TH AT T.O.:							171.778				

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DATE:   7/21/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:  353    ENGINE TYPE AND MODEL:  JT-8D-9                   SERIAL NUMBER:    P-674550

                           RATED THRUST:        14500.

      ENGINE TOTAL TIME:                                   -0. HRS

      TIME SINCE HOT SECTION OVERHAUL:                     -0. HRS

      TIME SINCE:

           N1 COMPRESSOR OVERHAUL:                         -0. HRS
           N2 COMPRESSOR OVERHAUL:                         -0. HRS
           COMBUSTOR CAN REPLACEMENT:                      -0. HRS
           FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         -0. HRS
           N1 TURBINE OVERHAUL:                            -0. HRS
           N2 TURBINE OVERHAUL:                            -0. HRS

      FUEL: JP-4                  FUEL H/C RATIO:   2.000

 OPERATIONAL DATA ******************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   72.00   FINISH   77.00

      ATMOSPHERIC PRESSURE:              START   30.08   FINISH   30.06

      INLET AIR HUMIDITY, LBS H2O/LB AIR:  -0.0000

      RELATIVE HUMIDITY:                   -0.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

      SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:   6

 COMMENTS:

  EXHAUST GAS PRESSURE IN INCHES HG
  SMOKE DENSITY IS VON BRAND MEASURE PARTICULATES ARE IN MG/M**3


 CLOCK      TEST          POWER                  ENGINE           MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE     TURBINE
 TIME       MODE    THRUST,LBS  PERCENT          SPEED              FUEL      AIR FLOW     F/A      DISCHARGE    PRESSURE     INLET
                        OR       RATED            RPM               FLOW      LB/SEC                  TEMP        RATIO       TEMP
                       SHP       T.O.        N1         N2          LB/HR                          DEGREES F       EPR     DEGREES F

 1658.00    2/ 0    5000.00        34     5770.00    9790.00     2843.00      82.10    0.009500      -0.00        1.29       -0.00
 1738.00    3/ 2    9450.00        65     7205.00   10810.00     5250.00     123.40    0.012100      -0.00        1.64       -0.00
 1753.00    4/ 3   10770.00        74     7515.00   11030.00     6035.00     131.90    0.013000      -0.00        1.75       -0.00
 1806.00    5/ 4   11850.00        81     7780.00   11205.00    11205.00     140.00    0.013600      -0.00        1.85       -0.00
 1813.00    6/ 5   13600.00        93     8250.00   11525.00     8000.00     153.00    0.014800      -0.00        2.04       -0.00
 1831.00    7/ 6     780.00         5     2600.00    6530.00      908.00      29.40    0.008800      -0.00        1.04       -0.00


 POWER     EXHAUST     EXHAUST        CO        CO       THC       NO        NO         NO      ALDEHYDES    SMOKE   PARTICULATES
 PERCENT     GAS         GAS         (WET)       2      (WET)     (WET)       2          X
 RATED      TEMP       PRESSURE      PPMV      (WET)     PPMV      PPMV     (WET)      (WET)
 T.O.     DEGREES F      PSIA                PERCENT V                      PPMV       PPMV

   34       700.00      38.61       11.00      2.59      1.80    167.00      8.60     175.60      -0.00      16.00       -0.00
   65       855.00      48.68       16.60      2.01      3.50     87.20      7.30      94.50      -0.00      24.00       -0.00
   74       900.00      51.87       14.10      2.32      1.30    105.00      7.70     112.80      -0.00      25.00       12.00
   81       935.00      54.83       12.70      2.47      1.20    123.70      8.90     132.60      -0.00      28.00       14.00
   93       995.00      59.80       11.00      2.72      4.60    162.30      9.70     172.00      -0.00      31.00       16.00
    5       675.00      31.27      220.30      0.87     86.90      2.40      5.40       7.60      -0.00       1.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   34       0.85      0.08      1.09   3136.19     21.14     22.23      2.41      0.23      3.09   8916.20     60.10     63.20
   65       1.65      0.20      1.19   3134.61     14.22     15.41      8.65      1.04      6.25  16456.70     74.64     80.88
   74       1.21      0.06      1.09   3135.66     14.84     15.94      7.32      0.39      6.57  18923.73     89.53     96.19
   81       1.03      0.05      1.18   3135.98     16.42     17.60     11.50      0.62     13.24  35138.66    183.97    197.20
   93       0.81      0.19      1.17   3135.95     19.56     20.73      6.46      1.55      9.35  25087.57    156.49    165.84
    5      48.84     11.03      1.97   3030.73      0.87      2.77     44.35     10.02      1.79   2751.90      0.79      2.51


 POWER          CO               CO              THC               NO               NO               NO
 PERCENT                          2                                                  2                X
 RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
 T.O.

   34          0.492         1783.240           0.045          12.020            0.619           12.639
   65          0.915         1741.449           0.111           7.898            0.661            8.559
   74          0.640         1757.078           0.036           8.313            0.610            8.931
   81          0.970         2965.288           0.053          15.525            1.117           16.642
   93          0.475         1844.675           0.114          11.507            0.688           12.194
    5         56.858         3528.077          12.845           1.017            2.289            3.222
    CAL ID NUMBER:  353   ENGINE TYPE AND MODEL: JT-8D-9                SERIAL NUMBER:   P-674550

TEST ORGANIZATION:  PRATT & WHITNEY


  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE    TIME IN     CO        FUEL     LB CO /     ENERGY   LB CO /
            POWER       # TH       RATE      RATE     WT FACTOR    MODE      MASS      MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.060       870.0    40.473    929.537    1.000      19.00    12.816     294.35     43.541    275.50    0.04652
TAKEOFF     1.000     14500.0     4.577   8597.602    1.000       0.70     0.053     100.31      0.532    169.17    0.00032
CLIMBOUT    0.850     12325.0     6.178   7138.484    1.000       2.20     0.227     261.74      0.865    451.92    0.00050
APPROACH    0.400      5800.0    26.024   3288.813    1.000       4.00     1.735     219.25      7.913    386.67    0.00449
TAXI-IDLE   0.060       870.0    40.473    929.537    1.000       7.00     4.722     108.45     43.541    101.50    0.04652

                                TOTAL FOR CYCLE:                        19.553     984.10               1384.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:         19.869
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:        14.120
                                LBS POLLUTANT/1000K LB TH AT T.O.:       0.368


  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE    TIME IN     HC        FUEL     LB HC /     ENERGY   LB HC /
            POWER       # TH       RATE      RATE     WT FACTOR    MODE      MASS      MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.060       870.0     8.500    929.537    1.000      19.00     2.692     294.35      9.144    275.50    0.00977
TAKEOFF     1.000     14500.0     0.220   8597.602    1.000       0.70     0.003     100.31      0.026    169.17    0.00002
CLIMBOUT    0.850     12325.0     0.420   7138.484    1.000       2.20     0.015     261.74      0.059    451.92    0.00003
APPROACH    0.400      5800.0     1.643   3288.813    1.000       4.00     0.110     219.25      0.500    386.67    0.00028
TAXI-IDLE   0.060       870.0     8.500    929.537    1.000       7.00     0.992     108.45      9.144    101.50    0.00977

                                TOTAL FOR CYCLE:                         3.811     984.10               1384.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:          3.872
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:         2.752
                                LBS POLLUTANT/1000K LB TH AT T.O.:       0.177


  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE    TIME IN     NOX       FUEL     LB NOX/     ENERGY   LB NOX/
            POWER       # TH       RATE      RATE     WT FACTOR    MODE      MASS      MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE   0.060       870.0     2.796    929.537    1.000      19.00     0.885     294.35      3.008    275.50    0.00321
TAKEOFF     1.000     14500.0   197.465   8597.602    1.000       0.70     2.304     100.31     22.967    169.17    0.01362
CLIMBOUT    0.850     12325.0   131.913   7138.484    1.000       2.20     4.837     261.74     18.479    451.92    0.01070
APPROACH    0.400      5800.0    34.648   3288.813    1.000       4.00     2.310     219.25     10.535    386.67    0.00597
TAXI-IDLE   0.060       870.0     2.796    929.537    1.000       7.00     0.326     108.45      3.008    101.50    0.00321

                                TOTAL FOR CYCLE:                        10.662     984.10               1384.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:         10.834
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:         7.700
                                LBS POLLUTANT/1000K LB TH AT T.O.:     158.880
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DATE: 8/20/71

TEST ORGANIZATION: PRATT & WHITNEY

ENGINE SUPPLIER: PRATT AND WHITNEY

ENGINE DATA **

CAL ID NUMBER: 357 ENGINE TYPE AND MODEL: JT-8D-9 SERIAL NUMBER: P-666988

RATED THRUST: 14500.

ENGINE TOTAL TIME: -0. HRS

TIME SINCE HOT SECTION OVERHAUL: -0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: -0. HRS
N2 COMPRESSOR OVERHAUL: -0. HRS
COMBUSTOR CAN REPLACEMENT: -0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: -0. HRS
N1 TURBINE OVERHAUL: -0. HRS
N2 TURBINE OVERHAUL: -0. HRS

FUEL: JP-4 FUEL H/C RATIO: 2.000

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 87.00 FINISH 87.00

ATMOSPHERIC PRESSURE: START 29.80 FINISH 29.76

INLET AIR HUMIDITY, LBS H2O/LB AIR: -0.0000

RELATIVE HUMIDITY: -0.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 2.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 6

COMMENTS:

EXHAUST GAS PRESSURE IN INCHES HG
SMOKE DENSITY IS VON BRAND MEASURE

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1359.00	1/ 0	5050.00	34	5790.00	9920.00	2932.00	82.30	0.009890	-0.00	1.30	-0.00
1438.00	3/ 1	890.00	6	2640.00	6745.00	910.00	30.00	0.008430	-0.00	1.04	-0.00
1714.00	4/ 3	9350.00	64	7165.00	10925.00	5280.00	118.60	0.012370	-0.00	1.63	-0.00
1531.00	5/ 4	10550.00	72	7435.00	11120.00	5990.00	126.10	0.013190	-0.00	1.73	-0.00
1541.00	6/ 5	11900.00	82	7760.00	11330.00	6860.00	135.50	0.014060	-0.00	1.85	-0.00
1301.00	7/ 6	13550.00	93	8200.00	11640.00	8110.00	148.50	0.015170	-0.00	2.02	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO$_2$ (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO$_2$ (WET) PPMV	NO$_x$ (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
34	715.00	38.55	41.90	1.68	5.90	34.60	9.50	44.10	-0.00	14.00	-0.00
6	690.00	30.97	189.20	1.07	29.60	0.20	5.30	5.50	-0.00	1.00	-0.00
64	865.00	47.96	17.40	2.38	4.90	85.70	9.70	95.40	-0.00	22.00	-0.00
72	905.00	50.75	14.70	2.54	3.20	102.60	9.90	112.50	-0.00	23.00	-0.00
82	950.00	54.22	12.70	2.73	3.30	127.40	11.90	139.30	-0.00	24.00	-0.00
93	1015.00	58.81	10.60	3.20	5.00	165.70	13.30	179.00	-0.00	24.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
34	4.97	0.40	1.85	3128.84	6.74	8.59	14.56	1.17	5.42	9173.77	19.75	25.17
6	34.60	3.10	1.59	3074.87	0.06	1.65	31.49	2.82	1.45	2798.13	0.05	1.50
64	1.46	0.24	1.34	3134.81	11.80	13.14	7.70	1.24	7.05	16551.78	62.31	69.36
72	1.15	0.14	1.28	3135.53	13.24	14.52	6.92	0.86	7.65	18781.84	79.31	86.96
82	0.93	0.14	1.43	3135.91	15.30	16.73	6.37	0.95	9.80	21512.32	104.95	114.75
93	0.56	0.18	1.36	3136.22	16.98	18.34	5.36	1.45	11.05	25434.70	137.68	148.73

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO$_2$ LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO$_2$ LB/1K#TH-HR	NO$_x$ LB/1K#TH-HR
34	2.884	1816.587	0.233	3.911	1.074	4.985
6	35.382	3143.967	3.170	0.061	1.628	1.689
64	0.824	1770.244	0.133	6.664	0.754	7.418
72	0.656	1780.270	0.082	7.518	0.725	8.243
82	0.535	1837.758	0.080	8.819	0.824	9.643
93	0.396	1877.100	0.107	10.161	0.816	10.977

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     CAL ID NUMBER:  357   ENGINE TYPE AND MODEL: JT-8D-9            SERIAL NUMBER:   P-666988

TEST ORGANIZATION:  PRATT & WHITNEY


  MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN       CO          FUEL     LB CO /     ENERGY    LB CO /
             POWER       # TH       RATE       RATE     WT FACTOR     MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR      LB/HR                  MIN.       LBS.         LBS.

TAXI-IDLE   0.060       870.0     29.299     908.189     1.000       19.00      9.278       287.59     32.261      275.50     0.03368
TAKEOFF     1.000     14500.0      3.432    8798.668     1.000        0.70      0.040       102.65      0.390      169.17     0.00024
CLIMBOUT    0.850     12325.0      5.425    7390.512     1.000        2.20      0.199       270.99      0.734      451.92     0.00044
APPROACH    0.400      5800.0     13.595    3364.328     1.000        4.00      0.906       224.29      4.041      386.67     0.00234
TAXI-IDLE   0.060       870.0     29.299     908.189     1.000        7.00      3.418       105.96     32.261      101.50     0.03368

                                  TOTAL FOR CYCLE:                             13.842       991.47                 1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:              13.961
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:              9.996
                                  LBS POLLUTANT/1000K LB TH AT T.O.:            0.276


  MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN       HC          FUEL     LB HC /     ENERGY    LB HC /
             POWER       # TH       RATE       RATE     WT FACTOR     MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR      LB/HR                  MIN.       LBS.         LBS.

TAXI-IDLE   0.060       870.0      2.812     908.189     1.000       19.00      0.891       287.59      3.097      275.50     0.00323
TAKEOFF     1.000     14500.0      0.735    8798.668     1.000        0.70      0.009       102.65      0.084      169.17     0.00005
CLIMBOUT    0.850     12325.0      0.926    7390.512     1.000        2.20      0.034       270.99      0.125      451.92     0.00008
APPROACH    0.400      5800.0      1.169    3364.328     1.000        4.00      0.078       224.29      0.348      386.67     0.00020
TAXI-IDLE   0.060       870.0      2.812     908.189     1.000        7.00      0.328       105.96      3.097      101.50     0.00323

                                  TOTAL FOR CYCLE:                              1.339       991.47                 1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:               1.351
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:              0.967
                                  LBS POLLUTANT/1000K LB TH AT T.O.:            0.591


  MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      NOX          FUEL     LB NOX/     ENERGY    LB NOX/
             POWER       # TH       RATE       RATE     WT FACTOR     MODE       MASS         MASS    1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR      LB/HR                  MIN.       LBS.         LBS.

TAXI-IDLE   0.060       870.0      1.875     908.189     1.000       19.00      0.594       287.59      2.064      275.50     0.00215
TAKEOFF     1.000     14500.0    177.574    8798.668     1.000        0.70      2.072       102.65     20.182      169.17     0.01225
CLIMBOUT    0.850     12325.0    125.448    7390.512     1.000        2.20      4.600       270.99     16.974      451.92     0.01018
APPROACH    0.400      5800.0     31.438    3364.328     1.000        4.00      2.096       224.29      9.344      386.67     0.00542
TAXI-IDLE   0.060       870.0      1.875     908.189     1.000        7.00      0.219       105.96      2.064      101.50     0.00215

                                  TOTAL FOR CYCLE:                              9.580       991.47                 1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:               9.662
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:              6.918
                                  LBS POLLUTANT/1000K LB TH AT T.O.:          142.876
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DATE:   7/ 9/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:  392    ENGINE TYPE AND MODEL:  JT-8D-9                    SERIAL NUMBER:    P674552

                             RATED THRUST:        14500.

     ENGINE TOTAL TIME:                                 -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       -0. HRS
          N2 COMPRESSOR OVERHAUL:                       -0. HRS
          COMBUSTOR CAN REPLACEMENT:                    -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       -0. HRS
          N1 TURBINE OVERHAUL:                          -0. HRS
          N2 TURBINE OVERHAUL:                          -0. HRS

     FUEL: JP-4C                 FUEL H/C RATIO:   2.000

 OPERATIONAL DATA ***********************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   96.00   FINISH   96.00

      ATMOSPHERIC PRESSURE:              START   29.96   FINISH   29.96

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0099

      RELATIVE HUMIDITY:                   -0.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

      SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:   8

 COMMENTS:

  EXHAUST GAS PRESSURE IN INCHES HG
  SMOKE DENSITY IS VON BRAND MEASURE PARTICULATES ARE IN MG/M**3


                              POWER                ENGINE              MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE      TURBINE
 CLOCK      TEST       THRUST,LBS  PERCENT          SPEED                FUEL     AIR FLOW      F/A     DISCHARGE     PRESSURE      INLET
 TIME       MODE           OR       RATED            RPM                 FLOW      LB/SEC                  TEMP         RATIO        TEMP
                           SHP      T.O.       N1          N2           LB/HR                           DEGREES F       EPR      DEGREES F

 1330.00    1/ 0       1100.00        7     3040.00     7325.00      1122.00      33.50    0.009300      -0.00        1.05        -0.00
 1324.00    2/ 1        680.00        4     2439.00     6420.00       890.00      27.60    0.009200      -0.00        1.03        -0.00
 1333.00    3/ 2       1600.00       11     3590.00     8060.00      1427.00      39.70    0.009900      -0.00        1.08        -0.00
 1345.00    4/ 3       5000.00       34     5775.00     9930.00      2884.00      71.50    0.011200      -0.00        1.30        -0.00
 1350.00    5/ 4       9050.00       62     7100.00    10900.00      5090.00     115.90    0.012200      -0.00        1.60        -0.00
 1410.00    6/ 5      10350.00       71     7410.00    11125.00      5865.00     123.70    0.013200      -0.00        1.71        -0.00
 1441.00    7/ 6      11550.00       79     7715.00    11340.00      6677.00    1313.00    0.014100      -0.00        1.83        -0.00
 1507.00   83/ 7      13100.00       90     8115.00    11593.00      7815.00     143.20    0.015100      -0.00        1.98        -0.00


                                                                                 NO          ALDEHYDES    SMOKE    PARTICULATES
  POWER      EXHAUST       EXHAUST         CO          CO       THC       NO       NO          X
 PERCENT       GAS           GAS          (WET)         2      (WET)    (WET)       2        (WET)
  RATED       TEMP        PRESSURE        PPMV        (WET)     PPMV     PPMV     (WET)      PPMV
  T.O.      DEGREES F       PSIA                   PERCENT V                      PPMV

    7        730.00       3145.00        156.40       1.14     35.40    10.70     3.00       13.70      -0.00        1.00       -0.00
    4        730.00         30.76        277.30       1.14    115.60     8.50     5.10       13.60      30.00        1.00       -0.00
   11        745.00         32.15        110.90       1.25     19.10    13.60     3.40       17.00      -0.00        2.00       -0.00
   34        715.00         38.51         47.30       1.53      5.30    32.60     5.60       38.20      -0.00       12.00       -0.00
   62        850.00         47.36         17.90       2.09      0.30    80.00     5.20       85.20      -0.00       24.00       -0.00
   71        895.00         50.52         14.10       2.23      0.20    99.40     5.90      105.30      -0.00       26.00       13.00
   79        940.00         53.90         12.90       2.31      4.30   116.90     7.90      124.80      -0.00       27.00       14.00
   90       1000.00         58.08         10.50       2.48      2.70   159.10     7.50      166.60      -0.00       30.00       16.00


  POWER     MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
  RATED      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.      LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    7        26.94       3.49       0.85     3045.83      3.03       3.88      30.23       3.92       0.95     3462.30      3.40       4.35
    4        46.96      11.21       1.42     3033.21      2.36       3.78      41.79       9.98       1.26     2699.56      2.10       3.37
   11        17.52       1.73       0.88     3105.47      3.53       4.42      25.00       2.47       1.26     4431.51      5.04       6.30
   34         6.15       0.39       1.20     3127.00      6.97       8.16      17.74       1.14       3.45     9018.25     20.09      23.54
   62         1.71       0.02       0.82     3135.02     12.54      13.36       8.70       0.08       4.15    15957.22     63.85      68.00
   71         1.26       0.01       0.87     3135.73     14.61      15.48       7.40       0.06       5.09    18391.08     85.70      90.78
   79         1.11       0.21       1.12     3135.41     16.59      17.7:       7.44       1.42       7.48    20935.13    110.75     118.24
   90         0.85       0.12       0.99     3136.07     21.03      22.0.       6.60       0.97       7.75    24508.42    164.37     172.12


                                                                                                   NO
  POWER          CO                   CO                  THC               NO              NO         X
 PERCENT                                2                                                    2     LB/1K#TH-HR
  RATED     LB/1K#TH-HR          LB/1K#TH-HR          LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

    7         27.483             3147.548               3.563             3.088            0.866           3.954
    4         61.460             3969.937              14.674             3.094            1.857           4.951
   11         15.625             2769.693               1.543             3.150            0.788           3.938
   34          3.549             1803.651               0.228             4.018            0.690           4.708
   62          0.961             1763.229               0.039             7.056            0.459           7.514
   71          0.715             1776.916               0.006             8.280            0.491           8.771
   79          0.644             1812.565               0.123             9.589            0.648          10.237
   90          0.504             1870.872               0.074            12.547            0.591          13.139
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    CAL ID NUMBER:  392   ENGINE TYPE AND MODEL: JT-8D-9             SERIAL NUMBER:   P674552

TEST ORGANIZATION:  PRATT & WHITNEY


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE    TIME IN      CO        FUEL     LB CO /     ENERGY   LB CO /
              POWER      # TH       RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060       870.0    32.660     991.122     1.000      19.00    10.342     313.86     32.952     275.50    0.03754
TAKEOFF     1.000     14500.0     2.205    8698.324     1.000       0.70     0.026     101.48      0.253     169.17    0.00015
CLIMBOUT    0.850     12325.0     4.731    7333.910     1.000       2.20     0.173     268.91      0.645     451.92    0.00038
APPROACH    0.400      5800.0    16.311    3293.130     1.000       4.00     1.087     219.54      4.953     386.67    0.00281
TAXI-IDLE   0.060       870.0    32.660     991.122     1.000       7.00     3.810     115.63     32.952     101.50    0.03754

                                  TOTAL FOR CYCLE:                          15.439    1019.42                1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:           15.145
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:          11.149
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         0.177


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE    TIME IN      HC        FUEL     LB HC /     ENERGY   LB HC /
              POWER      # TH       RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060       870.0     7.153     991.122     1.000      19.00     2.265     313.86      7.217     275.50    0.00822
TAKEOFF     1.000     14500.0     0.508    8698.324     1.000       0.70     0.006     101.48      0.058     169.17    0.00004
CLIMBOUT    0.850     12325.0     0.527    7333.910     1.000       2.20     0.019     268.91      0.072     451.92    0.00004
APPROACH    0.400      5800.0     1.102    3293.130     1.000       4.00     0.073     219.54      0.335     386.67    0.00019
TAXI-IDLE   0.060       870.0     7.153     991.122     1.000       7.00     0.835     115.63      7.217     101.50    0.00822

                                  TOTAL FOR CYCLE:                           3.199    1019.42                1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            3.138
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           2.310
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         0.409


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE    TIME IN      NOX       FUEL     LB NOX/     ENERGY   LB NOX/
              POWER      # TH       RATE       RATE     WT FACTOR    MODE      MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.      LBS.       LBS.

TAXI-IDLE   0.060       870.0     3.626     991.122     1.000      19.00     1.148     313.86      3.659     275.50    0.00417
TAKEOFF     1.000     14500.0   229.109    8698.324     1.000       0.70     2.673     101.48     26.339     169.17    0.01580
CLIMBOUT    0.850     12325.0   146.356    7333.910     1.000       2.20     5.366     268.91     19.956     451.92    0.01187
APPROACH    0.400      5800.0    29.997    3293.130     1.000       4.00     2.000     219.54      9.109     386.67    0.00517
TAXI-IDLE   0.060       870.0     3.626     991.122     1.000       7.00     0.423     115.63      3.659     101.50    0.00417

                                  TOTAL FOR CYCLE:                          11.611    1019.42                1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:           11.389
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:           8.385
                                  LBS POLLUTANT/1000K LB TH AT T.O.:       184.340
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DATE:   7/14/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA *********************************************************************************************************

    CAL ID NUMBER:  394    ENGINE TYPE AND MODEL:  JT-8D-9                       SERIAL NUMBER:    P-665705

                           RATED THRUST:        14500.

    ENGINE TOTAL TIME:                                 -0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                   -0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                       -0. HRS
         N2 COMPRESSOR OVERHAUL:                       -0. HRS
         COMBUSTOR CAN REPLACEMENT:                    -0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       -0. HRS
         N1 TURBINE OVERHAUL:                          -0. HRS
         N2 TURBINE OVERHAUL:                          -0. HRS

    FUEL: JP-4C              FUEL H/C RATIO:   2.000

OPERATIONAL DATA ***********************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   78.00   FINISH   80.00

    ATMOSPHERIC PRESSURE:              START   29.59   FINISH   29.58

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0109

    RELATIVE HUMIDITY:                      -0.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

    SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   8

COMMENTS:

 EXHAUST GAS PRESSURE IN INCHES HG
 SMOKE DENSITY IS VON BRAND MEASURE PARTICULATES ARE IN MG/M**3


 CLOCK       TEST            POWER                ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE      TURBINE
 TIME        MODE      THRUST,LBS  PERCENT         SPEED              FUEL     AIR FLOW      F/A      DISCHARGE     PRESSURE      INLET
                          OR        RATED           RPM               FLOW      LB/SEC                  TEMP         RATIO        TEMP
                          SHP       T.O.      N1          N2          LB/HR                           DEGREES F       EPR       DEGREES F

 1119.00     1/ 0       690.00        4    2410.00     6360.00       879.00      27.50    0.008900      -0.00         1.03        -0.00
 1124.00     2/ 1      1250.00        8    3190.00     7615.00      1189.00      36.20    0.009100      -0.00         1.06        -0.00
 1138.00     3/ 2      1740.00       11    3695.00     8130.00      1487.00      42.10    0.009800      -0.00         1.09        -0.00
 1142.00     4/ 3      5000.00       34    5750.00     9830.00      2861.00      85.20    0.009300      -0.00         1.30        -0.00
 1252.00     5/ 4      9470.00       65    7165.00    10860.00      5340.00     121.00    0.012300      -0.00         1.66        -0.00
 1303.00     6/ 5     10700.00       73    7440.00    11060.00      6040.00     128.00    0.013100      -0.00         1.76        -0.00
 1321.00     7/ 6     11720.00       80    7685.00    11230.00      6700.00     135.30    0.013800      -0.00         1.85        -0.00
 1339.00     8/ 7     13660.00       94    8200.00    11560.00      9120.00     149.30    0.015100      -0.00         2.04        -0.00


 POWER     EXHAUST      EXHAUST          CO          CO          THC        NO         NO         NO      ALDEHYDES    SMOKE    PARTICULATES
 PERCENT     GAS          GAS          (WET)          2         (WET)     (WET)        2          X
 RATED      TEMP       PRESSURE        PPMV        (WET)        PPMV      PPMV       (WET)      (WET)
 T.O.     DEGREES F      PSIA                    PERCENT V                           PPMV       PPMV

    4       720.00       30.58        215.30        0.93       81.30       5.60       1.00        6.60      5.00       2.00        -0.00
    8       705.00       31.38        119.50        0.98       30.70       6.90       2.20        9.10     -0.00       6.00        -0.00
   11       715.00       32.18        100.60        1.13       16.10      10.90       2.00       12.90     -0.00       5.00        -0.00
   34       695.00       38.26         43.30        1.42        4.10      29.30       4.60       33.90     -0.00      13.00        -0.00
   65       855.00       48.19         17.30        2.10        1.50      78.30       4.60       82.90     -0.00      -0.00        -0.00
   73       900.00       51.17         14.30        2.23        1.10      96.60       5.80      102.40     -0.00      24.00        -0.00
   80       935.00       53.66         12.70        2.34        1.70     118.30       3.90      122.20     -0.00      24.00        12.00
   94      1095.00       59.23         10.30        2.64        1.80     170.20       7.30      177.50     -0.00      24.00        12.00


 POWER     MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2        NO         NOX        CO          HC        NO2        CO2         NO         NOX
 RATED      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
 T.O.      LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    4       44.80       0.69       0.34    3040.77       1.91       2.26      35.38       8.52       0.30    2672.83       1.68       1.93
    8       23.98       3.53       0.73    3090.38       2.27       3.00      28.52       4.20       0.86    3674.46       2.70       3.57
   11       17.60       1.61       0.57    3105.67       3.13       3.71      26.17       2.40       0.85    4618.13       4.66       5.51
   34        6.14       0.33       1.06    3127.20       6.75       7.80      17.56       0.94       3.03    8946.91      19.30      22.33
   65        1.66       0.08       0.72    3134.94      12.22      12.94       8.78       0.44       3.83   16740.57      65.25      69.09
   73        1.28       0.06       0.85    3135.58      14.20      15.05       7.73       0.34       5.15   18938.91      85.76      90.91
   80        1.38       0.08       0.55    3135.31      16.57      17.12       7.26       0.56       3.66   21009.96     111.04     114.70
   94        0.78       0.08       0.91    3136.31      21.14      22.04       6.32       0.63       7.36   25466.81     171.64     179.00


 POWER          CO                 CO                 THC                NO                 NO                 NO
 PERCENT                            2                                                         2                  X
 RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
 T.O.

    4         57.075           3873.672           12.343              2.438              0.435              2.874
    8         22.813           2939.569            3.357              2.164              0.690              2.854
   11         15.038           2654.100            1.378              2.676              0.491              3.167
   34          3.513           1789.383            0.188              3.860              0.606              4.466
   65          0.927           1767.747            0.046              6.890              0.405              7.295
   73          0.722           1749.991            0.032              8.015              0.481              8.497
   80          0.619           1792.659            0.047              9.474              0.312              9.787
   94          0.403           1864.335            0.046             12.565              0.539             13.104
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    CAL ID NUMBER:  394   ENGINE TYPE AND MODEL: JT-8D-9              SERIAL NUMBER:   P-665705

TEST ORGANIZATION:  PRATT & WHITNEY


   MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL     LB CO /     ENERGY    LB CO /
             POWER        # TH       RATE       RATE     WT FACTOR     MODE      MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                    LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE   0.060        870.0    32.759     992.669     1.000       19.00    10.374      314.34     33.001     275.50     0.03765
TAKEOFF     1.000      14500.0     3.174    8600.570     1.000        0.70     0.037      100.34      0.369     169.17     0.00022
CLIMBOUT    0.850      12325.0     5.686    7253.199     1.000        2.20     0.208      265.95      0.784     451.92     0.00046
APPROACH    0.400       5800.0    16.478    3211.089     1.000        4.00     1.099      214.07      5.132     386.67     0.00284
TAXI-IDLE   0.060        870.0    32.759     992.669     1.000        7.00     3.822      115.81     33.001     101.50     0.03765

                                  TOTAL FOR CYCLE:                            15.540     1010.52                1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:             15.378
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:            11.222
                                  LBS POLLUTANT/1000K LB TH AT T.O.:           0.255


   MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL     LB HC /     ENERGY    LB HC /
             POWER        # TH       RATE       RATE     WT FACTOR     MODE      MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                    LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE   0.060        870.0     6.495     992.669     1.000       19.00     2.057      314.34      6.543     275.50     0.00747
TAKEOFF     1.000      14500.0     0.332    8600.570     1.000        0.70     0.004      100.34      0.039     169.17     0.00002
CLIMBOUT    0.850      12325.0     0.350    7253.199     1.000        2.20     0.013      265.95      0.048     451.92     0.00003
APPROACH    0.400       5800.0     1.017    3211.089     1.000        4.00     0.068      214.07      0.317     386.67     0.00018
TAXI-IDLE   0.060        870.0     6.495     992.669     1.000        7.00     0.758      115.81      6.543     101.50     0.00747

                                  TOTAL FOR CYCLE:                             2.899     1010.52                1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:              2.869
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:             2.094
                                  LBS POLLUTANT/1000K LB TH AT T.O.:           0.267


   MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN     NOX         FUEL     LB NOX/     ENERGY    LB NOX/
             POWER        # TH       RATE       RATE     WT FACTOR     MODE      MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                    LB/HR      LB/HR                   MIN.      LBS.        LBS.

TAXI-IDLE   0.060        870.0     2.237     992.669     1.000       19.00     0.708      314.34      2.253     275.50     0.00257
TAKEOFF     1.000      14500.0   211.123    8600.570     1.000        0.70     2.463      100.34     24.548     169.17     0.01456
CLIMBOUT    0.850      12325.0   136.287    7253.199     1.000        2.20     4.997      265.95     18.790     451.92     0.01106
APPROACH    0.400       5800.0    27.182    3211.089     1.000        4.00     1.812      214.07      8.465     386.67     0.00469
TAXI-IDLE   0.060        870.0     2.237     992.669     1.000        7.00     0.261      115.81      2.253     101.50     0.00257

                                  TOTAL FOR CYCLE:                            10.242     1010.52                1384.75
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:             10.135
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:             7.396
                                  LBS POLLUTANT/1000K LB TH AT T.O.:         169.869
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DATE:   7/15/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  395    ENGINE TYPE AND MODEL:  JT-8D-9                     SERIAL NUMBER:     P-665706

                            RATED THRUST:        14500.

      ENGINE TOTAL TIME:                                    -0. HRS

      TIME SINCE HOT SECTION OVERHAUL:                      -0. HRS

      TIME SINCE:

           N1 COMPRESSOR OVERHAUL:                          -0. HRS
           N2 COMPRESSOR OVERHAUL:                          -0. HRS
           COMBUSTOR CAN REPLACEMENT:                       -0. HRS
           FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          -0. HRS
           N1 TURBINE OVERHAUL:                             -0. HRS
           N2 TURBINE OVERHAUL:                             -0. HRS

      FUEL:  JP-4              FUEL H/C RATIO:   2.000

  OPERATIONAL DATA ************************************************************

       INLET AIR TEMPERATURE, DEGREES F:  START    70.00   FINISH   75.00

       ATMOSPHERIC PRESSURE:              START    29.76   FINISH   29.76

       INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0103

       RELATIVE HUMIDITY:                 -0.00  PERCENT

       SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:     2.00

       SAMPLE LINE TRANSPORT TIME, SEC:    1.00

  NUMBER OF TESTS:   8

  COMMENTS:

   EXHAUST GAS PRESSURE IN INCHES HG
   SMOKE DENSITY IS VON BRAND MEASURE PARTICULATES ARE IN MG/M**3


  CLOCK     TEST          POWER                ENGINE          MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
   TIME     MODE    THRUST,LBS  PERCENT        SPEED             FUEL      AIR FLOW      F/A     DISCHARGE    PRESSURE      INLET
                        OR       RATED          RPM              FLOW      LB/SEC                  TEMP        RATIO        TEMP
                       SHP       T.O.       N1         N2        LB/HR                          DEGREES F       EPR      DEGREES F

   921.00   1/ 0     720.00        4     2425.00    6340.00     872.00     28.00    0.008600     -0.00         1.03        -0.00
   931.00   2/ 1    1220.00        8     3150.00    7405.00    1179.00     36.30    0.009020     -0.00         1.06        -0.00
   943.00   3/ 2    1720.00       11     3680.00    8060.00    1481.00     42.50    0.009680     -0.00         1.09        -0.00
   950.00   4/ 3    5000.00       34     5735.00    9770.00    2869.00     86.60    0.009190     -0.00         1.30        -0.00
  1101.00   7/ 4   10800.00       74     7450.00   11035.00    6065.00    129.90    0.012970     -0.00         1.75        -0.00
  1113.00   8/ 7   11850.00       81     7680.00   11175.00    6780.00    137.40    0.013600     -0.00         1.85        -0.00
  1129.00   9/ 8   13600.00       93     8160.00   11500.00    8010.00    150.90    0.014700     -0.00         2.02        -0.00
  1140.00   6/ 3    9540.00       65     7150.00   10840.00    5275.00    122.00    0.012000     -0.00         1.64        -0.00


   POWER    EXHAUST      EXHAUST         CO         CO          THC        NO         NO         NO     ALDEHYDES   SMOKE   PARTICULATES
  PERCENT     GAS          GAS          (WET)         2        (WET)      (WET)        2          X
   RATED     TEMP       PRESSURE        PPMV       (WET)       PPMV       PPMV      (WET)      (WET)
   T.O.    DEGREES F      PSIA                   PERCENT V                           PPMV       PPMV

     4      700.00       30.75         216.70       0.97       75.30       3.20       3.80       7.00      5.00      1.00      -0.00
     8      705.00       31.55         118.30       0.99       14.20       5.80       4.50      10.30     -0.00      2.00      -0.00
    11      720.00       32.35          93.40       1.07        3.70       8.70       3.00      11.70     -0.00      3.00      -0.00
    34      690.00       38.31          46.80       1.48        6.50      28.80       7.20      36.00     -0.00     12.00      -0.00
    74      890.00       51.25          14.50       2.26        2.00      99.70       7.80     107.50     -0.00     24.00      12.00
    81      920.00       54.13          12.50       8.30        5.80     120.00       8.30     128.30     -0.00     27.00      14.00
    93      990.00       58.90          10.90       8.10        6.70     165.30       8.10     173.40     -0.00     29.00      14.00
    65      840.00       48.16          17.00       8.20        3.90      85.90       8.20      94.10     -0.00     -0.00      -0.00


   POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
  PERCENT     CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2        CO2        NO       NOX
   RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR      LB/HR     LB/HR     LB/HR
   T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

     4      63.31      8.62      1.25    3046.05      1.05      2.30     37.77      7.52      1.09    2656.15      0.92      2.00
     8      23.55      1.62      1.47    3096.31      1.90      3.37     27.76      1.91      1.73    3650.55      2.24      3.97
    11      17.28      0.39      0.91    3109.53      2.64      3.55     25.58      0.58      1.35    4605.21      3.91      5.26
    34       6.29      0.50      1.59    3126.49      6.36      7.95     18.05      1.44      4.56    8969.89     18.25     22.81
    74       1.28      0.10      1.13    3135.46     14.46     15.59      7.77      0.61      6.86   19016.54     87.70     94.56
    81       0.30      0.08      0.33    3137.05      4.74      5.07      2.04      0.54      2.22   21269.20     32.15     34.37
    93       0.27      0.09      0.33    3137.06      6.69      7.02      2.13      0.76      2.63   25127.88     53.61     56.23
    65       0.41      0.05      0.33    3136.94      3.44      3.76      2.18      0.29      1.73   16547.38     18.12     19.85


   POWER          CO                 CO                THC               NO                NO                NO
  PERCENT                              2                                                      2                 X
   RATED     LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR
   T.O.

     4         52.453           3489.103           10.439             1.272             1.511             2.783
     8         22.757           2992.253            1.564             1.833             1.422             3.254
    11         14.875           2677.449            0.337             2.276             0.785             3.061
    34          3.610           1723.978            0.287             3.649             0.912             4.562
    74          0.719           1760.790            0.057             8.120             0.635             8.756
    81          0.172           1794.870            0.046             2.713             0.188             2.900
    93          0.157           1847.638            0.056             3.942             0.193             4.135
    65          0.229           1734.526            0.030             1.900             0.181             2.081
    CAL ID NUMBER:  395   ENGINE TYPE AND MODEL: JT-8D-9                 SERIAL NUMBER:   P-665706

TEST ORGANIZATION:  PRATT & WHITNEY

  MODE    FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN       CO        FUEL     LB CO /     ENERGY    LB CO /
            POWER        # TH      RATE       RATE     WT FACTOR     MODE       MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.       LBS.       LBS.

TAXI-IDLE   0.060        870.0   31.002     949.518     1.000       19.00      9.817     300.68     32.651     275.50    0.03563
TAKEOFF     1.000      14500.0    0.564    8544.902     1.000        0.70      0.007      99.69      0.066     169.17    0.00004
CLIMBOUT    0.850      12325.0    1.913    7198.484     1.000        2.20      0.070     263.94      0.266     451.92    0.00016
APPROACH    0.400       5800.0   14.942    3322.161     1.000        4.00      0.996     221.48      4.498     386.67    0.00258
TAXI-IDLE   0.060        870.0   31.002     949.518     1.000        7.00      3.617     110.78     32.651     101.50    0.03563

                                 TOTAL FOR CYCLE:                             14.507     996.57                1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              14.557
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             10.476
                                 LBS POLLUTANT/1000K LB TH AT T.O.:            0.045

  MODE    FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN       HC        FUEL     LB HC /     ENERGY    LB HC /
            POWER        # TH      RATE       RATE     WT FACTOR     MODE       MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.       LBS.       LBS.

TAXI-IDLE   0.060        870.0    5.558     949.518     1.000       19.00      1.760     300.68      5.854     275.50    0.00639
TAKEOFF     1.000      14500.0    0.302    8544.902     1.000        0.70      0.004      99.69      0.035     169.17    0.00002
CLIMBOUT    0.850      12325.0    0.482    7198.484     1.000        2.20      0.018     263.94      0.067     451.92    0.00004
APPROACH    0.400       5800.0    1.256    3322.161     1.000        4.00      0.084     221.48      0.378     386.67    0.00022
TAXI-IDLE   0.060        870.0    5.558     949.518     1.000        7.00      0.648     110.78      5.854     101.50    0.00639

                                 TOTAL FOR CYCLE:                              2.514     996.57                1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               2.522
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              1.815
                                 LBS POLLUTANT/1000K LB TH AT T.O.:            0.243

  MODE    FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN      NOX        FUEL     LB NOX/     ENERGY    LB NOX/
            POWER        # TH      RATE       RATE     WT FACTOR     MODE       MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                  LB/HR      LB/HR                   MIN.       LBS.       LBS.

TAXI-IDLE   0.060        870.0    2.328     949.518     1.000       19.00      0.737     300.68      2.451     275.50    0.00268
TAKEOFF     1.000      14500.0  182.490    8544.902     1.000        0.70      2.129      99.69     21.357     169.17    0.01259
CLIMBOUT    0.850      12325.0  129.329    7198.484     1.000        2.20      4.742     263.94     17.966     451.92    0.01049
APPROACH    0.400       5800.0   28.989    3322.161     1.000        4.00      1.933     221.48      8.726     386.67    0.00500
TAXI-IDLE   0.060        870.0    2.328     949.518     1.000        7.00      0.272     110.78      2.451     101.50    0.00268

                                 TOTAL FOR CYCLE:                              9.812     996.57                1384.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:               9.846
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:              7.086
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          146.831
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DATE:   7/16/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY
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ENGINE DATA ******************************************************************************************************************
                                                                                   SERIAL NUMBER:     P-665708
     CAL ID NUMBER:  396    ENGINE TYPE AND MODEL:  JT-8D-9

                            RATED THRUST:         14500.

                                                       -0. HRS
      ENGINE TOTAL TIME:
                                                       -0. HRS
      TIME SINCE HOT SECTION OVERHAUL:

      TIME SINCE:

           N1 COMPRESSOR OVERHAUL:                      -0. HRS
           N2 COMPRESSOR OVERHAUL:                      -0. HRS
           COMBUSTOR CAN REPLACEMENT:                   -0. HRS
           FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      -0. HRS
           N1 TURBINE OVERHAUL:                         -0. HRS
           N2 TURBINE OVERHAUL:                         -0. HRS

      FUEL: JP-4                FUEL H/C RATIO:   2.000

  OPERATIONAL DATA ********************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   80.00   FINISH   84.00

      ATMOSPHERIC PRESSURE:              START   29.86   FINISH   29.87

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0099

      RELATIVE HUMIDITY:                 -0.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:     2.00

      SAMPLE LINE TRANSPORT TIME, SEC:    1.00

   NUMBER OF TESTS:   6

   COMMENTS:

   EXHAUST GAS PRESSURE IN INCHES HG
   SMOKE DENSITY IS VON BRAND MEASURE PARTICULATES ARE IN MG/M**3


                                                                                                             TURBINE
                                                                                      COMPRESSOR    ENGINE    INLET
                                                   ENGINE       MEASURED   GAS GEN   CALC   DISCHARGE   PRESSURE    TEMP
  CLOCK    TEST          POWER                      SPEED         FUEL     AIR FLOW   F/A      TEMP      RATIO    DEGREES F
  TIME     MODE   THRUST,LBS  PERCENT               RPM           FLOW      LB/SEC           DEGREES F    EPR
                      OR      RATED                               LB/HR
                     SHP      T.O.        N1         N2

 3128.00   1/ 0    5100.00     35      5785.00    9900.00      2911.00     86.20  0.009400    -0.00       1.30      -0.00
 3142.00   2/ 1     740.00      5      2615.00    6675.00       899.00     29.40  0.008500    -0.00       1.04      -0.00
 1218.00   3/ 2    9500.00     65      7160.00   10935.00      5340.00    119.90  0.012400    -0.00       1.63      -0.00
 1232.00   4/ 3   10750.00     74      7440.00   11140.00      6106.00    127.90  0.013300    -0.00       1.75      -0.00
 1243.00   5/ 4   11950.00     82      7725.00   11340.00      6875.00    135.70  0.014100    -0.00       1.85      -0.00
 1301.00   6/ 5   13650.00     94      8160.00   11635.00      8130.00    148.30  0.015200    -0.00       2.02      -0.00


                                                                       NO        NO      ALDEHYDES   SMOKE   PARTICULATES
  POWER    EXHAUST    EXHAUST      CO        CO       THC      NO        2         X
 PERCENT     GAS        GAS       (WET)       2      (WET)    (WET)    (WET)     (WET)
  RATED     TEMP      PRESSURE    PPMV      (WET)    PPMV     PPMV     PPMV      PPMV
  T.O.    DEGREES F     PSIA             PERCENT V

   35      705.00      38.61      44.80     1.46      6.00    30.90     6.10     37.00      -0.00     15.00      -0.00
    5      685.00      30.95     227.70     0.95    102.10     7.20     4.70     11.90       7.00      1.00      -0.00
   65      860.00      48.17      17.40     2.11      3.30    85.30     7.80     93.10      -0.00     19.00      -0.00
   74      900.00      51.36      13.90     2.27      4.60   105.90     8.80    114.70      -0.00     21.00      10.00
   82      940.00      54.44      12.00     2.45      3.20   131.80     9.70    141.50      -0.00     23.00      12.00
   94      995.00      59.12      10.30     2.74      1.90   174.50    10.40    184.90      -0.00     25.00      12.00


  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
  RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   35       6.11      0.47      1.37   3126.87      6.92      8.28     17.78      1.36      3.98   9102.30     20.14     24.11
    5      46.26     11.88      1.57   3032.47      2.40      3.97     41.59     10.68      1.41   2726.19      2.16      3.57
   65       1.65      0.18      1.21   3134.67     13.25     14.46      8.79      0.95      6.47  16739.13     70.74     77.21
   74       1.21      0.23      1.27   3135.20     15.29     16.56      7.41      1.41      7.76  19143.54     93.36    101.12
   82       0.98      0.15      1.30   3135.80     17.64     18.93      6.72      1.03      8.92  21558.62    121.24    130.16
   94       0.75      0.08      1.24   3136.35     20.88     22.13      6.10      0.64     10.12  25498.49    169.76    179.88


                                                                                  NO                NO
  POWER          CO               CO             THC             NO               2                 X
 PERCENT                           2                                         LB/1K#TH-HR       LB/1K#TH-HR
  RATED     LB/1K#TH-HR      LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR
  T.O.

   35          3.486          1784.766          0.267           3.949           0.780             4.728
    5         56.197          3684.041         14.432           2.919           1.905             4.824
   65          0.925          1762.014          0.100           7.447           0.681             8.128
   74          0.689          1730.795          0.132           8.685           0.722             9.407
   82          0.562          1804.068          0.086          10.146           0.747            10.892
   94          0.447          1868.021          0.047          12.437           0.741            13.178
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CAL ID NUMBER:  396   ENGINE TYPE AND MODEL: JT-8D-9                SERIAL NUMBER:   P-665708

TEST ORGANIZATION:  PRATT & WHITNEY

                                                                                                              
  MODE     FRACTIONAL    POWER    EMISSION     FUEL       USAGE    TIME IN      CO       FUEL    LB CO /    ENERGY    LB CO /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE      MASS      MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE    0.060        870.0    40.029     967.974     1.000     19.00    12.676    306.52     41.353    275.50   0.04601
TAKEOFF      1.000      14500.0     5.033    8707.441     1.000      0.70     0.059    101.59      0.578    169.17   0.00035
CLIMBOUT     0.850      12325.0     5.883    7332.477     1.000      2.20     0.216    268.86      0.802    451.92   0.00048
APPROACH     0.400       5800.0    17.377    3342.371     1.000      4.00     1.158    222.82      5.199    386.67   0.00300
TAXI-IDLE    0.060        870.0    40.029     967.974     1.000      7.00     4.670    112.93     41.353    101.50   0.04601
                                                                             18.779   1012.72               1384.75
                           TOTAL FOR CYCLE:                                  18.543
                           LBS POLLUTANT/1K LB FUEL/CYCLE:                   13.561
                           LBS POLLUTANT/1K LB TH-HR/CYCLE:                   0.405
                           LBS POLLUTANT/1000K LB TH AT T.O.:


  MODE     FRACTIONAL    POWER    EMISSION     FUEL       USAGE    TIME IN      HC       FUEL    LB HC /    ENERGY    LB HC /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE      MASS      MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE    0.060        870.0     9.150     967.974     1.000     19.00     2.898    306.52      9.453    275.50   0.01052
TAKEOFF      1.000      14500.0     0.209    8707.441     1.000      0.70     0.002    101.59      0.024    169.17   0.00001
CLIMBOUT     0.850      12325.0     0.370    7332.477     1.000      2.20     0.014    268.86      0.050    451.92   0.00003
APPROACH     0.400       5800.0     1.249    3342.371     1.000      4.00     0.083    222.82      0.374    386.67   0.00022
TAXI-IDLE    0.060        870.0     9.150     967.974     1.000      7.00     1.068    112.93      9.453    101.50   0.01052
                                                                              4.064   1012.72               1384.75
                           TOTAL FOR CYCLE:                                   4.013
                           LBS POLLUTANT/1K LB FUEL/CYCLE:                    2.935
                           LBS POLLUTANT/1K LB TH-HR/CYCLE:                   0.168
                           LBS POLLUTANT/1000K LB TH AT T.O.:


  MODE     FRACTIONAL    POWER    EMISSION     FUEL       USAGE    TIME IN      NOX      FUEL    LB NOX/    ENERGY    LB NOX/
             POWER       # TH       RATE       RATE     WT FACTOR    MODE      MASS      MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.      LBS.      LBS.

TAXI-IDLE    0.060        870.0     3.953     967.974     1.000     19.00     1.252    306.52      4.084    275.50   0.00454
TAKEOFF      1.000      14500.0   208.563    8707.441     1.000      0.70     2.433    101.59     23.952    169.17   0.01438
CLIMBOUT     0.850      12325.0   145.595    7332.477     1.000      2.20     5.338    268.86     19.856    451.92   0.01181
APPROACH     0.400       5800.0    30.365    3342.371     1.000      4.00     2.024    222.82      9.085    386.67   0.00524
TAXI-IDLE    0.060        870.0     3.953     967.974     1.000      7.00     0.461    112.93      4.084    101.50   0.00454
                                                                             11.509   1012.72               1384.75
                           TOTAL FOR CYCLE:                                  11.365
                           LBS POLLUTANT/1K LB FUEL/CYCLE:                    8.311
                           LBS POLLUTANT/1K LB TH-HR/CYCLE:                 167.809
                           LBS POLLUTANT/1000K LB TH AT T.O.:
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DATE: 7/12/71

TEST ORGANIZATION: PRATT & WHITNEY

ENGINE SUPPLIER: PRATT AND WHITNEY

ENGINE DATA **

CAL ID NUMBER: 393 ENGINE TYPE AND MODEL: JT8D-11 SERIAL NUMBER: P676215

RATED THRUST: 15000.

ENGINE TOTAL TIME: -0. HRS

TIME SINCE HOT SECTION OVERHAUL: -0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: -0. HRS
N2 COMPRESSOR OVERHAUL: -0. HRS
COMBUSTOR CAN REPLACEMENT: -0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: -0. HRS
N1 TURBINE OVERHAUL: -0. HRS
N2 TURBINE OVERHAUL: -0. HRS

FUEL: JP-4 FUEL H/C RATIO: 2.000

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START -0.00 FINISH -0.00

ATMOSPHERIC PRESSURE: START -0.00 FINISH -0.00

INLET AIR HUMIDITY, LBS H2O/LB AIR: -0.0000

RELATIVE HUMIDITY: -0.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 2.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 9

COMMENTS:

EXHAUST GAS PRESSURE IN INCHES HG
SMOKE DENSITY IS VON BRAND MEASURE PARTICULATES ARE IN MG/M**3

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1033.00	1/ 0	1350.00	8	3250.00	7545.00	1293.00	37.70	0.009500	-0.00	1.07	-0.00
1040.00	2/ 1	1870.00	12	3760.00	8160.00	1596.00	43.70	0.010100	-0.00	1.10	-0.00
1058.00	3/ 2	850.00	5	2605.00	6640.00	945.00	30.20	0.008700	-0.00	1.04	-0.00
1121.00	4/ 3	5070.00	33	5675.00	9740.00	2930.00	73.00	0.011200	-0.00	1.29	-0.00
1222.00	5/ 4	9550.00	63	7110.00	10770.00	5465.00	122.00	0.012400	-0.00	1.64	-0.00
1239.00	6/ 5	10920.00	72	7180.00	10990.00	6275.00	129.60	0.013500	-0.00	1.75	-0.00
1254.00	7/ 6	12000.00	79	7625.00	11155.00	6950.00	136.00	0.014200	-0.00	1.86	-0.00
1310.00	8/ 7	13360.00	89	7950.00	11370.00	7930.00	146.60	0.015000	-0.00	1.98	-0.00
1331.00	9/ 8	14330.00	95	8220.00	11545.00	8640.00	[illegible].00	0.015600	-0.00	2.07	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO2 (WET) PERCENT V	THC (WET) PPMV	[illegible] PPMV	NO2 (WET) PPMV	NOX (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
8	715.00	32.09	136.80	1.14	31.60	12.60	5.10	17.70	-0.00	2.00	-0.00
12	735.00	32.88	110.30	1.23	12.40	15.50	6.40	21.90	-0.00	3.00	-0.00
5	675.00	31.29	214.40	1.09	74.60	5.10	5.80	10.90	6.00	1.00	-0.00
33	710.00	38.65	46.30	1.53	4.90	33.40	7.50	40.90	-0.00	15.00	-0.00
63	860.00	48.70	15.60	2.25	1.20	95.80	7.60	103.40	-0.00	25.00	-0.00
72	905.00	51.89	13.70	2.41	0.70	118.80	8.50	127.30	-0.00	27.00	-0.00
79	940.00	54.88	12.00	2.53	0.50	142.40	10.00	152.40	-0.00	28.00	14.00
89	985.00	58.45	10.50	2.69	1.40	175.10	11.90	187.00	-0.00	29.00	14.00
95	1025.00	60.94	9.90	2.79	1.70	198.30	15.60	213.90	-0.00	31.00	16.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
8	23.62	3.12	1.45	3092.07	3.57	5.02	30.53	4.04	1.87	3998.05	4.62	6.49
12	17.73	1.14	1.69	3106.76	4.09	5.78	28.30	1.82	2.70	4958.38	6.53	9.23
5	38.27	7.63	1.70	3056.70	1.50	3.20	36.16	7.21	1.61	2888.58	1.41	3.02
33	6.02	0.37	1.60	3127.28	7.14	8.74	17.65	1.07	4.70	9162.93	20.91	25.61
63	1.38	0.06	1.11	3135.40	13.96	15.06	7.56	0.33	6.05	17134.98	76.27	82.32
72	1.13	0.03	1.16	3135.87	16.16	17.32	7.12	0.21	7.26	19677.59	101.40	108.66
79	0.95	0.02	1.30	3136.20	18.45	19.75	6.58	0.16	9.01	21796.56	128.25	137.26
89	0.73	0.06	1.46	3136.35	21.42	22.88	6.20	0.47	11.54	24871.26	169.88	181.42
95	0.71	0.07	1.83	3136.44	23.30	25.14	6.12	0.60	15.84	27098.83	201.35	217.19

POWER PERCENT RATED T.O.	CO LB/1K*TH-HR	CO2 LB/1K*TH-HR	THC LB/1K*TH-HR	NO LB/1K*TH-HR	NO2 LB/1K*TH-HR	NOX LB/1K*TH-HR
8	22.618	2961.518	2.992	3.422	1.385	4.807
12	15.133	2651.543	0.974	3.493	1.442	4.935
5	42.543	3398.333	8.478	1.662	1.890	3.553
33	3.481	1807.295	0.211	4.124	0.926	5.051
63	0.792	1794.239	0.035	7.986	0.634	8.620
72	0.652	1801.978	0.019	9.286	0.664	9.950
79	0.548	1816.380	0.013	10.688	0.751	11.438
89	0.464	1861.621	0.035	12.715	0.864	13.579
95	0.427	1891.056	0.042	14.051	1.105	15.156

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     CAL ID NUMBER:  393   ENGINE TYPE AND MODEL: JT8D-11                    SERIAL NUMBER:   P676215

TEST ORGANIZATION:  PRATT & WHITNEY

                                                                                                LB CO /     ENERGY   LB CO /
  MODE    FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN      CO       FUEL    1K LB FUEL  # TH-HR  # TH-HR
            POWER        # TH      RATE       RATE     WT FACTOR    MODE       MASS      MASS
                                   LB/HR      LB/HR                 MIN.       LBS.      LBS.

                                                                                        322.69     34.213     285.00   0.03874
TAXI-IDLE   0.060      900.0    34.864   1019.034     1.000       19.00    11.040      105.42      0.199     175.00   0.00012
TAKEOFF     1.000    15000.0     1.798   9035.734     1.000        0.70     0.021      280.46      0.611     467.50   0.00037
CLIMBOUT    0.850    12750.0     4.675   7648.832     1.000        2.20     0.171      232.54      4.689     400.00   0.00273
APPROACH    0.400     6000.0    16.356   3488.132     1.000        4.00     1.090      118.89     34.213     105.00   0.03874
TAXI-IDLE   0.060      900.0    34.864   1019.034     1.000        7.00     4.068

                              TOTAL FOR CYCLE:                             16.391    1060.00                1432.50
                              LBS POLLUTANT/1K LB FUEL/CYCLE:              15.463
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:             11.442
                              LBS POLLUTANT/1000K LB TH AT T.O.:            0.140

                                                                                                LB HC /     ENERGY   LB HC /
  MODE    FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN      HC       FUEL    1K LB FUEL  # TH-HR  # TH-HR
            POWER        # TH      RATE       RATE     WT FACTOR    MODE       MASS      MASS
                                   LB/HR      LB/HR                 MIN.       LBS.      LBS.

                                                                                        322.69      6.872     285.00   0.00778
TAXI-IDLE   0.060      900.0     7.003   1019.034     1.000       19.00     2.218      105.42      0.0       175.00   0.0
TAKEOFF     1.000    15000.0     0.0     9035.734     1.000        0.70     0.0        280.46      0.006     467.50   0.00000
CLIMBOUT    0.850    12750.0     0.045   7648.832     1.000        2.20     0.002      232.54      0.271     400.00   0.00016
APPROACH    0.400     6000.0     0.945   3488.132     1.000        4.00     0.063      118.89      6.872     105.00   0.00778
TAXI-IDLE   0.060      900.0     7.003   1019.034     1.000        7.00     0.817

                              TOTAL FOR CYCLE:                              3.099    1060.00                1432.50
                              LBS POLLUTANT/1K LB FUEL/CYCLE:               2.924
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:              2.164
                              LBS POLLUTANT/1000K LB TH AT T.O.:            0.0

                                                                                                LB NOX/     ENERGY   LB NOX/
  MODE    FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN      NOX      FUEL    1K LB FUEL  # TH-HR  # TH-HR
            POWER        # TH      RATE       RATE     WT FACTOR    MODE       MASS      MASS
                                   LB/HR      LB/HR                 MIN.       LBS.      LBS.

                                                                                        322.69      3.359     285.00   0.00380
TAXI-IDLE   0.060      900.0     3.423   1019.034     1.000       19.00     1.084      105.42     26.769     175.00   0.01613
TAKEOFF     1.000    15000.0   241.876   9035.734     1.000        0.70     2.822      280.46     21.507     467.50   0.01290
CLIMBOUT    0.850    12750.0   164.505   7648.832     1.000        2.20     6.032      232.54      9.937     400.00   0.00578
APPROACH    0.400     6000.0    34.660   3488.132     1.000        4.00     2.311      118.89      3.359     105.00   0.00380
TAXI-IDLE   0.060      900.0     3.423   1019.034     1.000        7.00     0.399

                              TOTAL FOR CYCLE:                             12.648    1060.00                1432.50
                              LBS POLLUTANT/1K LB FUEL/CYCLE:              11.932
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:              8.829
                              LBS POLLUTANT/1000K LB TH AT T.O.:          188.126
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DATE:   7/ 7/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:   61    ENGINE TYPE AND MODEL:  JT9D                      SERIAL NUMBER:    X-495-14A

                            RATED THRUST:        43500.

     ENGINE TOTAL TIME:                                -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      -0. HRS
          N2 COMPRESSOR OVERHAUL:                      -0. HRS
          COMBUSTOR CAN REPLACEMENT:                   -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      -0. HRS
          N1 TURBINE OVERHAUL:                         -0. HRS
          N2 TURBINE OVERHAUL:                         -0. HRS

     FUEL: JP-4C                FUEL H/C RATIO:   2.000

OPERATIONAL DATA ***********************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   81.60   FINISH   76.30

     ATMOSPHERIC PRESSURE:              START   29.97   FINISH   30.00

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0100

     RELATIVE HUMIDITY:                    42.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:     2.00

     SAMPLE LINE TRANSPORT TIME, SEC:     1.00

NUMBER OF TESTS:  10

COMMENTS:

 D-7 SHORT CONE


 CLOCK      TEST          POWER                     ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
  TIME      MODE    THRUST,LBS  PERCENT             SPEED               FUEL      AIR FLOW     F/A      DISCHARGE    PRESSURE      INLET
                        OR        RATED              RPM                FLOW       LB/SEC                 TEMP        RATIO        TEMP
                       SHP        T.O.         N1          N2          LB/HR                           DEGREES F       EPR      DEGREES F

 2121.00    1/ 0     2948.00        6       1022.50     4956.00      1732.00      45.64    0.010500      837.30        1.02       1122.20
 2138.00    2/ 1     4028.00        9       1185.60     5330.00      2071.00      53.39    0.010800      885.40        1.02       1180.90
 2148.00    3/ 2    10167.00       23       1860.60     6386.00      4246.00      86.51    0.013600     1061.20        1.07       1518.00
 2201.00    4/ 3    31208.00       71       2989.60     7252.00     11879.00     165.40    0.019960     1321.60        1.28       2111.90
 2213.00    5/ 4    36753.00       84       3172.00     7394.00     14183.00     191.71    0.021690     1370.30        1.36       2251.50
 2222.00    6/ 5    40570.00       94       3302.80     7556.00     16052.00     192.71    0.023100     1407.40        1.42       2364.50
 2232.00    7/ 6    33044.00       75       3045.60     7288.00     12588.00     175.00    0.020000     1333.00        1.31       2155.00
 2243.00    8/ 7    20780.00       47       2543.00     7168.00      8420.00     129.50    0.018200     1232.00        1.16       1954.20
 2250.00    9/ 8     7538.00       17       1610.50     6048.00      3250.00      75.10    0.012000      995.40        1.05       1363.40
 2303.00   10/ 9     3413.00        7       1102.80     5151.00      1882.00      52.20    0.010000      857.60        1.02       1135.10


 POWER     EXHAUST      EXHAUST          CO          CO        THC         NO         NO          NO      ALDEHYDES    SMOKE   PARTICULATES
PERCENT      GAS          GAS          (WET)          2       (WET)      (WET)         2           X
 RATED      TEMP       PRESSURE        PPMV        (WET)      PPMV       PPMV       (WET)       (WET)
 T.O.     DEGREES F      PSIA                    PERCENT V                          PPMV        PPMV

   6        670.50       14.94        488.00       1.59     243.00       9.30       4.50       13.80      -0.00       -0.00       -0.00
   9        675.90       15.03        361.50       1.68      68.90      12.00       8.10       20.10      -0.00       -0.00       -0.00
  23        768.00       15.64         84.20       2.24      14.70      41.70       9.00       50.70      -0.00       -0.00       -0.00
  71        953.80       18.46         12.20       3.37       6.30     226.00      12.50      238.50      -0.00       -0.00       -0.00
  84       1010.10       19.70         11.00       3.64       5.80     319.00      16.90      335.90      -0.00       -0.00       -0.00
  94       1524.10       20.57         11.60       3.84       7.60     404.10      21.60      425.70      -0.00       -0.00       -0.00
  75       1436.10       18.98         11.20       3.38       6.30     251.70      14.50      266.20      -0.00       -0.00       -0.00
  47       1397.00       16.96         17.70       3.00       6.90     141.10      10.60      151.70      -0.00       -0.00       -0.00
  17       1168.10       15.36        150.60       1.88      34.10      26.80      12.40       39.20      -0.00       -0.00       -0.00
   7       1116.70       14.98        423.20       1.57     184.30       6.90      11.20       18.10      -0.00       -0.00       -0.00


 POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
PERCENT      CO         HC         NO2        CO2         NO        NOX         CO         HC         NO2        CO2         NO        NOX
 RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K       LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
 T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   6       58.50      16.71       0.89    2999.83       1.83       2.72     101.49      28.94       1.54    5195.70       3.18       4.71
   9       41.90       4.57       1.54    3059.37       2.28       3.83      86.77       9.47       3.19    6335.95       4.73       7.92
  23        7.47       0.75       1.31    3123.95       6.08       7.39      31.73       3.17       5.57   13264.29      25.81      31.39
  71        0.72       0.21       1.22    3136.02      21.99      23.20       8.58       2.54      14.45   37252.82     261.17     275.61
  84        0.60       0.18       1.52    3136.30      28.73      30.26       8.56       2.58      21.59   44482.09     407.53     429.12
  94        0.60       0.23       1.84    3136.18      34.50      36.35       9.68       3.63      29.60   50341.86     553.82     583.42
  75        0.66       0.21       1.41    3136.12      24.41      25.82       8.33       2.68      17.70   39477.48     307.32     325.03
  47        1.18       0.26       1.16    3135.18      15.42      16.57       9.91       2.18       9.75   26398.25     129.80     139.55
  17       15.84       2.05       2.14    3107.22       4.63       6.77      51.49       6.68       6.96   10098.46      15.05      22.01
   7       51.82      12.93       2.25    3020.86       1.39       3.64      97.53      24.33       4.74    5685.25       2.61       6.85


 POWER          CO                 CO                 THC                 NO                 NO                 NO
PERCENT                             2                                                          2                  X
 RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
 T.O.

   6         34.427           1762.449              9.818              1.078              0.521              1.599
   9         21.542           1572.976              2.351              1.175              0.793              1.967
  23          3.121           1304.642              0.312              2.539              0.548              3.087
  71          0.275           1193.695              0.081              8.369              0.463              8.831
  84          0.233           1210.299              0.070             11.088              0.587             11.676
  94          0.236           1228.750              0.089             13.518              0.723             14.240
  75          0.252           1194.695              0.081              9.300              0.536              9.836
  47          0.477           1270.369              0.105              6.246              0.469              6.715
  17          6.830           1339.673              0.886              1.996              0.924              2.920
   7         28.577           1665.763              7.128              0.765              1.242              2.008
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     CAL ID NUMBER:   61   ENGINE TYPE AND MODEL: JT9D                    SERIAL NUMBER:   X-495-14A

TEST ORGANIZATION:  PRATT & WHITNEY


  MODE    FRACTIONAL   POWER    EMISSION    FUEL      USAGE    TIME IN     CO        FUEL     LB CO /    ENERGY    LB CO /
            POWER      # TH       RATE      RATE    WT FACTOR   MODE      MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR     LB/HR                MIN.     LBS.       LBS.

TAXI-IDLE   0.070     3045.0  112.534   1889.137    1.000      19.00    35.636     598.23    59.569     964.25     0.03696
TAKEOFF     1.000    43500.0   18.885  17066.461    1.000       0.70     0.220     199.11     1.107     507.50     0.00043
CLIMBOUT    0.850    36975.0   18.179  14537.785    1.000       2.20     0.667     533.05     1.250    1355.75     0.00049
APPROACH    0.300    13050.0   26.695   5458.695    1.000       4.00     1.780     363.91     4.890     870.00     0.00205
TAXI-IDLE   0.070     3045.0  112.534   1889.137    1.000       7.00    13.129     220.40    59.569     355.25     0.03696

                              TOTAL FOR CYCLE:                          51.431    1914.70               4052.75
                              LBS POLLUTANT/1K LB FUEL/CYCLE:           26.861
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:          12.690
                              LBS POLLUTANT/1000K LB TH AT T.O.:         0.506


  MODE    FRACTIONAL   POWER    EMISSION    FUEL      USAGE    TIME IN     HC        FUEL     LB HC /    ENERGY    LB HC /
            POWER      # TH       RATE      RATE    WT FACTOR   MODE      MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR     LB/HR                MIN.     LBS.       LBS.

TAXI-IDLE   0.070     3045.0   85.205   1889.137    1.000      19.00    26.982     598.23    45.103     964.25     0.02798
TAKEOFF     1.000    43500.0    6.622  17066.461    1.000       0.70     0.077     199.11     0.388     507.50     0.00015
CLIMBOUT    0.850    36975.0    5.641  14537.785    1.000       2.20     0.207     533.05     0.388    1355.75     0.00015
APPROACH    0.300    13050.0    5.542   5458.695    1.000       4.00     0.369     363.91     1.015     870.00     0.00042
TAXI-IDLE   0.070     3045.0   85.205   1889.137    1.000       7.00     9.941     220.40    45.103     355.25     0.02798

                              TOTAL FOR CYCLE:                          37.576    1914.70               4052.75
                              LBS POLLUTANT/1K LB FUEL/CYCLE:           19.625
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:           9.272
                              LBS POLLUTANT/1000K LB TH AT T.O.:         1.776


  MODE    FRACTIONAL   POWER    EMISSION    FUEL      USAGE    TIME IN     NOX       FUEL     LB NOX/    ENERGY    LB NOX/
            POWER      # TH       RATE      RATE    WT FACTOR   MODE      MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR     LB/HR                MIN.     LBS.       LBS.

TAXI-IDLE   0.070     3045.0    5.822   1889.137    1.000      19.00     1.844     598.23     3.082     964.25     0.00191
TAKEOFF     1.000    43500.0  681.509  17066.461    1.000       0.70     7.951     199.11    39.933     507.50     0.01967
CLIMBOUT    0.850    36975.0  444.902  14537.785    1.000       2.20    16.313     533.05    30.603    1355.75     0.01203
APPROACH    0.300    13050.0   50.315   5458.695    1.000       4.00     3.354     363.91     9.217     870.00     0.00386
TAXI-IDLE   0.070     3045.0    5.822   1889.137    1.000       7.00     0.679     220.40     3.082     355.25     0.00191

                              TOTAL FOR CYCLE:                          30.141    1914.70               4052.75
                              LBS POLLUTANT/1K LB FUEL/CYCLE:           15.742
                              LBS POLLUTANT/1K LB TH-HR/CYCLE:           7.437
                              LBS POLLUTANT/1000K LB TH AT T.O.:       182.780
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DATE:   7/ 8/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:  147    ENGINE TYPE AND MODEL:  JT9D                     SERIAL NUMBER:    X-495-148

                           RATED THRUST:         43500.

     ENGINE TOTAL TIME:                                -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      -0. HRS
          N2 COMPRESSOR OVERHAUL:                      -0. HRS
          COMBUSTOR CAN REPLACEMENT:                   -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      -0. HRS
          N1 TURBINE OVERHAUL:                         -0. HRS
          N2 TURBINE OVERHAUL:                         -0. HRS

     FUEL: JP-4C                 FUEL H/C RATIO:   2.000

 OPERATIONAL DATA *************************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   85.20   FINISH   84.60

      ATMOSPHERIC PRESSURE:              START   30.07   FINISH   30.07

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.1100

      RELATIVE HUMIDITY:                      47.50  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

      SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:  10

 COMMENTS:

  D-7 SHORT CONE


  CLOCK      TEST          POWER              ENGINE         MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE     TURBINE
  TIME       MODE    THRUST,LBS  PERCENT      SPEED            FUEL      AIR FLOW     F/A      DISCHARGE    PRESSURE     INLET
                        OR        RATED        RPM             FLOW      LB/SEC                  TEMP        RATIO       TEMP
                        SHP       T.O.     N1        N2        LB/HR                           DEGREES F      EPR      DEGREES F

 1050.00     1/ 0     2742.00       6    1023.40   4977.00    1749.00     45.58    0.011630     839.00       1.02      11308.00
 1059.00     2/ 1     3764.00       8    1191.50   5370.00    2102.00     53.56    0.011900     888.10       1.02       1191.00
 1112.00     3/ 2    11040.00      25    1977.00   6622.00    4846.00     91.30    0.016090    1101.20       1.08       1619.20
 1133.00     4/ 3    29841.00      70    3032.80   7420.00   12463.00    166.53    0.022690    1352.20       1.29       2136.80
 1140.00     5/ 4    37004.00      85    3242.40   7580.00   15218.00    184.58    0.025000    1405.80       1.38       2347.80
 1151.00     6/ 5    34530.00      79    3172.00   7503.80   14128.00    177.94    0.024070    1384.60       1.35       2282.50
 1203.00     7/ 6    33946.00      78    3144.10   7484.70   13834.00    174.73    0.024000    1377.70       1.33       2203.20
 1212.00     8/ 7    21482.00      49    2652.90   7108.60    8618.00    135.01    0.019350    1255.90       1.18       1937.30
 1225.00     9/ 8     7306.00      16    1642.20   6178.60    3397.00     74.73    0.015780    1019.40       1.05       1418.00
 1238.00    10/ 9     3323.00       7    1130.80   5272.10    1960.00     50.47    0.011770     876.20       1.02       1172.70


  POWER     EXHAUST       EXHAUST         CO          CO         THC       HC         NO          NO      ALDEHYDES   SMOKE    PARTICULATES
 PERCENT      GAS           GAS          (WET)          2       (WET)     (WET)        2           X
  RATED       TEMP        PRESSURE        PPMV       (WET)       PPMV      PPMV      (WET)       (WET)
  T.O.     DEGREES F        PSIA                   PERCENT V                          PPMV        PPMV

     6     1130.20         14.96       1069.00       1.58      233.00      7.50       8.20       15.70     -0.00      -0.00      -0.00
     8     1138.50         15.03        751.70       1.66      127.50     10.80      10.70       21.50     -0.00      -0.00      -0.00
    25     1269.70         15.78         55.40       2.43        7.70     54.90       8.70       63.60     -0.00      -0.00      -0.00
    70     1444.00         18.82         10.60       3.70        2.10    278.60      17.30      295.90     -0.00      -0.00      -0.00
    85     1520.70         20.08          9.70       4.01        4.50    411.10      24.00      435.10     -0.00      -0.00      -0.00
    79     1497.20         19.54          9.50       3.86        9.70    344.50      21.30      365.80     -0.00      -0.00      -0.00
    78     1492.40         19.14          9.70       3.78        9.60    322.10      20.20      342.30     -0.00      -0.00      -0.00
    49     1366.60         17.17         15.90       2.97        5.70    136.50      10.70      147.20     -0.00      -0.00      -0.00
    16     1200.40         15.36        116.40       2.05       21.90     28.50      13.60       42.10     -0.00      -0.00      -0.00
     7     1145.10         14.99        369.40       1.67      141.10      6.90      13.30       20.20


  POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
  RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K     LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

     6      124.41      15.58       1.57    2898.87       1.44       3.01     218.32      27.25       2.75     5070.11       2.52       5.27
     8       85.88       8.34       2.01    2979.92       2.03       4.03     180.52      17.54       4.22     6263.79       4.26       8.48
    25        4.57       0.36       1.17    3129.57       7.39       8.56      22.16       1.75       5.68    15165.88      35.82      41.50
    70        0.57       0.06       1.53    3136.67      24.69      26.22       7.13       0.81      19.11    39092.29     307.72     326.83
    85        0.48       0.13       1.96    3136.63      33.62      35.58       7.35       1.95      29.87    47733.28     511.57     541.44
    79        0.49       0.29       1.81    3136.18      29.26      31.07       6.94       4.06      25.56    44308.00     413.40     438.96
    78        0.51       0.29       1.75    3136.14      27.96      29.69       7.09       4.02      24.26    43385.41     386.48     410.71
    49        1.07       0.22       1.19    3135.46      15.06      16.25       9.21       1.89      10.18    27021.43     129.83     140.00
    16       11.30       1.21       2.16    3116.60       4.53       6.69      38.39       4.12       7.34    10587.28      15.39      22.73
     7       42.86       9.38       2.53    3044.67       1.32       3.85      84.01      18.38       4.97     5967.55       2.58       7.55


  POWER          CO                CO               THC               NO                NO                NO
 PERCENT                             2                                                    2                 X
  RATED     LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR       LB/1K*TH-HR
  T.O.

     6         79.622          1849.057            9.939             0.918             1.003             1.921
     8         47.961          1666.130            6.659             1.132             1.121             2.253
    25          2.308          1373.720            0.159             3.244             0.514             3.759
    70          0.231          1267.543            0.026             9.978             0.620            10.597
    85          0.199          1289.950            0.053            13.825             0.807            14.632
    79          0.201          1283.176            0.118            11.972             0.740            12.712
    78          0.209          1279.072            0.118            11.385             0.714            12.099
    49          0.429          1257.866            0.088             6.044             0.674             6.517
    16          5.255          1449.172            0.564             2.106             1.005             3.111
     7         25.292          1795.836            5.531             0.776             1.495             2.271
     CAL ID NUMBER:  147   ENGINE TYPE AND MODEL: JT9D                    SERIAL NUMBER:   X-495-148

TEST ORGANIZATION:  PRATT & WHITNEY

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     CO         FUEL     LB CO /    ENERGY    LB CO /
             POWER      # TH       RATE       RATE     WT FACTOR    MODE      MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                 MIN.      LBS.        LBS.

TAXI-IDLE   0.070      3045.0   129.265   1844.465     1.000      19.00    40.934      584.08     70.083     964.25    0.04245
TAKEOFF     1.000     43500.0     4.727  18016.625     1.000       0.70     0.055      210.19      0.262     507.50    0.00011
CLIMBOUT    0.850     36975.0    11.819  15128.035     1.000       2.20     0.433      554.69      0.781    1355.75    0.00032
APPROACH    0.300     13050.0    22.675   5462.012     1.000       4.00     1.512      364.13      4.151     870.00    0.00174
TAXI-IDLE   0.070      3045.0   129.265   1844.465     1.000       7.00    15.081      215.19     70.083     355.25    0.04245

                                 TOTAL FOR CYCLE:                          58.015     1928.29               4052.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           30.086
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          14.315
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         0.127


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     HC         FUEL     LB HC /    ENERGY    LB HC /
             POWER      # TH       RATE       RATE     WT FACTOR    MODE      MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                 MIN.      LBS.        LBS.

TAXI-IDLE   0.070      3045.0    23.592   1844.465     1.000      19.00     7.471      584.08     12.791     964.25    0.00775
TAKEOFF     1.000     43500.0     2.786  18016.625     1.000       0.70     0.033      210.19      0.155     507.50    0.00006
CLIMBOUT    0.850     36975.0     3.114  15128.035     1.000       2.20     0.114      554.69      0.206    1355.75    0.00008
APPROACH    0.300     13050.0     1.353   5462.012     1.000       4.00     0.090      364.13      0.248     870.00    0.00010
TAXI-IDLE   0.070      3045.0    23.592   1844.465     1.000       7.00     2.752      215.19     12.791     355.25    0.00775

                                 TOTAL FOR CYCLE:                          10.460     1928.29               4052.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            5.425
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           2.581
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         0.747


  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/    ENERGY    LB NOX/
             POWER      # TH       RATE       RATE     WT FACTOR    MODE      MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                 MIN.      LBS.        LBS.

TAXI-IDLE   0.070      3045.0     6.737   1844.465     1.000      19.00     2.134      584.08      3.653     964.25    0.00221
TAKEOFF     1.000     43500.0   904.633  18016.625     1.000       0.70    10.554      210.19     50.211     507.50    0.02080
CLIMBOUT    0.850     36975.0   538.073  15128.035     1.000       2.20    19.729      554.69     35.568    1355.75    0.01455
APPROACH    0.300     13050.0    54.637   5462.012     1.000       4.00     3.642      364.13     10.003     870.00    0.00419
TAXI-IDLE   0.070      3045.0     6.737   1844.465     1.000       7.00     0.786      215.19      3.653     355.25    0.00221

                                 TOTAL FOR CYCLE:                          36.845     1928.29               4052.75
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           19.108
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           9.091
                                 LBS POLLUTANT/1000K LB TH AT T.O.:       242.622
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DATE: 7/ 8/71

TEST ORGANIZATION: PRATT & WHITNEY

ENGINE SUPPLIER: PRATT AND WHITNEY

ENGINE DATA **

CAL ID NUMBER: 148 ENGINE TYPE AND MODEL: JT9D SERIAL NUMBER: X-495-14C

RATED THRUST: 43500.

ENGINE TOTAL TIME: -0. HRS

TIME SINCE HOT SECTION OVERHAUL: -0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: -0. HRS
N2 COMPRESSOR OVERHAUL: -0. HRS
COMBUSTOR CAN REPLACEMENT: -0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: -0. HRS
N1 TURBINE OVERHAUL: -0. HRS
N2 TURBINE OVERHAUL: -0. HRS

FUEL: JP-5 FUEL H/C RATIO: 1.970

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 89.40 FINISH 88.30

ATMOSPHERIC PRESSURE: START 30.03 FINISH 30.02

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0083

RELATIVE HUMIDITY: 21.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 2.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 7

COMMENTS:

D-7 SHORT CONE

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1711.00	1/ 0	2482.00	5	996.00	4898.00	1700.00	44.24	0.010680	379.00	1.01	1120.80
1723.00	2/ 1	3493.00	8	1166.00	5310.00	2063.00	51.75	0.011070	433.40	1.02	1195.10
1730.00	3/ 2	10968.00	25	1984.00	6642.00	4930.00	90.15	0.015190	657.10	1.08	1644.40
1752.00	4/ 3	31280.00	71	3061.00	7381.00	12778.00	167.13	0.021240	903.10	1.30	2198.60
1759.00	5/ 4	36151.00	83	3233.00	7564.00	15004.00	181.26	0.022990	953.70	1.37	2339.00
1828.00	6/ 5	33051.00	75	3130.00	7433.00	13610.00	172.24	0.021950	921.40	1.32	2254.00
1830.00	7/ 6	21006.00	48	2640.00	7050.00	8540.00	133.73	0.017740	794.80	1.17	1910.10

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO 2 (WET) PPMV	NO X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
5	678.30	14.90	468.10	1.80	240.60	9.60	11.10	20.70	-0.00	-0.00	-0.00
8	692.90	14.99	340.50	1.83	132.80	13.80	15.30	29.10	-0.00	-0.00	-0.00
25	834.50	15.75	73.00	2.49	9.50	62.40	13.00	75.40	-0.00	-0.00	-0.00
71	1015.30	18.92	9.90	3.58	2.20	314.10	17.50	331.60	-0.00	-0.00	-0.00
83	1082.00	19.89	9.80	4.00	0.90	465.40	25.20	490.60	-0.00	-0.00	-0.00
75	1039.10	19.21	10.00	3.75	2.30	367.60	20.30	387.90	-0.00	-0.00	-0.00
48	899.30	17.09	22.40	2.87	2.50	143.00	11.90	154.90	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
5	50.07	14.74	1.95	3025.41	1.69	3.64	85.13	25.06	3.32	5143.19	2.87	6.18
8	36.30	8.11	2.68	3065.25	2.42	5.10	74.88	16.73	5.53	6323.60	4.99	10.51
25	5.85	0.44	1.71	3134.14	8.21	9.92	28.83	2.15	8.43	15451.30	40.48	48.91
71	0.55	0.07	1.61	3143.46	28.83	30.44	7.07	0.90	20.53	40167.16	368.42	388.94
83	0.49	0.03	2.07	3143.68	38.24	40.31	7.35	0.39	31.06	47167.82	573.71	604.78
75	0.53	0.07	1.78	3143.49	32.21	33.99	7.26	0.96	24.21	42782.94	438.43	462.64
48	1.56	0.10	1.36	3141.80	16.36	17.73	13.33	0.85	11.63	26830.95	139.76	151.39

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO 2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO 2 LB/1K#TH-HR	NO X LB/1K#TH-HR
5	34.297	2072.197	10.096	1.155	1.336	2.491
8	21.438	1810.365	4.789	1.427	1.582	3.009
25	2.629	1408.762	0.196	3.691	0.769	4.460
71	0.226	1284.117	0.029	11.778	0.656	12.434
83	0.203	1304.745	0.011	15.870	0.859	16.729
75	0.220	1294.452	0.029	13.265	0.733	13.998
48	0.634	1277.300	0.041	6.653	0.554	7.207

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     CAL ID NUMBER:  148   ENGINE TYPE AND MODEL: JT9D                       SERIAL NUMBER:   X-495-14C

  TEST ORGANIZATION:  PRATT & WHITNEY

     MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      CO        FUEL    LB CO /     ENERGY    LB CO /
               POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                     LB/HR     LB/HR                  MIN.       LBS.       LBS.

  TAXI-IDLE    0.070      3045.0    84.971   1899.832     1.000      19.00     26.907     601.61     44.726    964.25    0.02791
  TAKEOFF      1.000     43500.0     7.947  17927.234     1.000       0.70      0.093     209.15      0.443    507.50    0.00018
  CLIMBOUT     0.850     36975.0     8.013  15234.750     1.000       2.20      0.294     558.61      0.526   1355.75    0.00022
  APPROACH     0.300     13050.0    26.390   5647.430     1.000       4.00      1.759     376.50      4.673    870.00    0.00202
  TAXI-IDLE    0.070      3045.0    84.971   1899.832     1.000       7.00      9.913     221.65     44.726    355.25    0.02791

                                TOTAL FOR CYCLE:                               38.967    1967.51               4052.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                19.805
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:                9.615
                                LBS POLLUTANT/1000K LB TH AT T.O.:              0.213


     MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      HC        FUEL    LB HC /     ENERGY    LB HC /
               POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                     LB/HR     LB/HR                  MIN.       LBS.       LBS.

  TAXI-IDLE    0.070      3045.0    20.312   1899.832     1.000      19.00      6.432     601.61     10.691    964.25    0.00667
  TAKEOFF      1.000     43500.0     3.657  17927.234     1.000       0.70      0.043     209.15      0.204    507.50    0.00008
  CLIMBOUT     0.850     36975.0     3.108  15234.750     1.000       2.20      0.114     558.61      0.204   1355.75    0.00008
  APPROACH     0.300     130[illegible]     2.509   5647.430     1.000       4.00      0.167     376.50      0.444    870.00    0.00019
  TAXI-IDLE    0.070      30[illegible]    20.312   1899.832     1.000       7.00      2.370     221.65     10.691    355.25    0.00667

                                TOTAL FOR CYCLE:                                9.126    1967.51               4052.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                 4.638
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:                2.252
                                LBS POLLUTANT/1000K LB TH AT T.O.:              0.981


     MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     NOX        FUEL    LB NOX/     ENERGY    LB NOX/
               POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                     LB/HR     LB/HR                  MIN.       LBS.       LBS.

  TAXI-IDLE    0.070      3045.0     7.631   1899.832     1.000      19.00      2.417     601.61      4.017    964.25    0.00251
  TAKEOFF      1.000     43500.0   958.718  17927.234     1.000       0.70     11.185     209.15     53.478    507.50    0.02204
  CLIMBOUT     0.850     36975.0   616.146  15234.750     1.000       2.20     22.592     558.61     40.443   1355.75    0.01666
  APPROACH     0.300     13050.0    62.475   5647.430     1.000       4.00      4.165     376.50     11.063    870.00    0.00479
  TAXI-IDLE    0.070      3045.0     7.631   1899.832     1.000       7.00      0.890     221.65      4.017    355.25    0.00251

                                TOTAL FOR CYCLE:                               41.249    1967.51               4052.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:                20.965
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:               10.178
                                LBS POLLUTANT/1000K LB TH AT T.O.:            257.127
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DATE:   7/ 8/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:  149    ENGINE TYPE AND MODEL:  JT9D                        SERIAL NUMBER:    X-495-14D

                            RATED THRUST:          43500.

     ENGINE TOTAL TIME:                                    -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          -0. HRS
          N2 COMPRESSOR OVERHAUL:                          -0. HRS
          COMBUSTOR CAN REPLACEMENT:                       -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          -0. HRS
          N1 TURBINE OVERHAUL:                             -0. HRS
          N2 TURBINE OVERHAUL:                             -0. HRS

     FUEL: JP-5                  FUEL H/C RATIO:   1.970

OPERATIONAL DATA ******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   88.00   FINISH   70.20

     ATMOSPHERIC PRESSURE:              START   30.02   FINISH   30.02

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0104

     RELATIVE HUMIDITY:                  29.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   6

COMMENTS:

 D-7 SHORT CONE


  CLOCK      TEST          POWER                  ENGINE            MEASURED    GAS GEN      CALC      COMPRESSOR    ENGINE      TURBINE
  TIME       MODE    THRUST,LBS  PERCENT          SPEED               FUEL     AIR FLOW      F/A      DISCHARGE    PRESSURE      INLET
                         OR       RATED            RPM                FLOW      LB/SEC                   TEMP        RATIO        TEMP
                        SHP       T.O.       N1          N2          LB/HR                            DEGREES F      EPR      DEGREES F

 1840.00     1/ 0     7297.00      16     1668.00     6185.00      3504.00      75.68    0.012860      568.50       1.05       1427.10
 1853.00     2/ 1     2951.00       6     1082.00     5119.00      1871.00      48.23    0.010780      404.80       1.02       1150.50
 2303.00     3/ 2    10962.00      25       -0.00     6538.00      4925.00      -0.00    0.015180       -0.00      -0.00         -0.00
   31.00     4/ 3    30560.00      70     2999.00     7230.00     12255.00     167.98    0.020270      852.20       1.29       2046.00
  119.00     5/ 4    33733.00      77     3100.00     7306.00     13540.00     177.83    0.021150      877.40       1.33       2124.10
  433.00     6/ 5     2909.00       6     1046.00     4974.00      1827.00      47.97    0.010580      369.30       1.02       1103.30


  POWER     EXHAUST      EXHAUST          CO          CO        THC        NO        NO         NO      ALDEHYDES   SMOKE   PARTICULATES
 PERCENT      GAS          GAS          (WET)          2       (WET)     (WET)        2          X
  RATED      TEMP       PRESSURE        PPMV        (WET)      PPMV      PPMV      (WET)      (WET)
  T.O.    DEGREES F       PSIA                    PERCENT V                        PPMV       PPMV

   16       748.00       15.32        136.00        2.12      26.00     41.10     15.90      57.00     -0.00      -0.00      -0.00
    6       677.00       14.93        832.30        1.80     173.90     17.10     13.50      30.60     -0.00      -0.00      -0.00
   25        -0.00       -0.00         69.30        2.53       5.40     50.90      8.30      59.20     -0.00      -0.00      -0.00
   70       958.00       18.78         11.10        3.60       4.00    224.40     13.80     238.20     -0.00      -0.00      -0.00
   77       983.30       19.38         10.70        3.80       2.50    268.70      0.40     269.10     -0.00      -0.00      -0.00
    6       640.70       14.96        555.00        1.62     338.80      7.00      0.50       7.50     -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO       NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   16       12.74      1.40      2.45   3120.68      6.32      8.77     44.65      4.89      8.57  10934.85     22.16     30.74
    6       87.64     10.49      2.33   2978.05      2.96      5.29    163.97     19.62      4.37   5571.93      5.53      9.90
   25        5.47      0.24      1.08   3135.27      6.59      7.67     26.92      1.20      5.30  15441.19     32.48     37.77
   70        0.62      0.13      1.26   3143.21     20.48     21.74      7.56      1.56     15.46  38520.00    251.01    266.44
   77        0.56      0.08      0.03   3143.43     23.24     23.27      7.63      1.02      0.47  42562.07    314.62    315.09
    6       64.98     22.72      0.10   2980.10      1.35      1.44    118.72     41.51      0.18   5444.64      2.46      2.64


  POWER          CO                CO              THC               NO               NO               NO
 PERCENT                            2                                                   2                X
  RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

   16           6.118          1498.540            0.670            3.037            1.175            4.212
    6          55.566          1888.151            6.649            1.875            1.480            3.356
   25           2.456          1408.610            0.110            2.963            0.483            3.446
   70           0.247          1260.471            0.051            8.214            0.505            8.719
   77           0.226          1261.734            0.030            9.327            0.014            9.341
    6          40.810          1871.655           14.268            0.845            0.060            0.906
    CAL ID NUMBER:  149   ENGINE TYPE AND MODEL: JT9D                  SERIAL NUMBER:   X-495-14D

TEST ORGANIZATION:  PRATT & WHITNEY


   MODE   FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     CO        FUEL     LB CO /    ENERGY   LB CO /
             POWER      # TH      RATE      RATE    WT FACTOR    MODE     MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                 MIN.     LBS.       LBS.

TAXI-IDLE   0.070      3045.0  160.584   1971.791    1.000      19.00   50.852     624.40     81.441     964.25    0.05274
TAKEOFF     1.000     43500.0   10.779  17325.500    1.000       0.70    0.126     202.13      0.622     507.50    0.00025
CLIMBOUT    0.850     36975.0   13.259  14807.000    1.000       2.20    0.486     542.92      0.895    1355.75    0.00036
APPROACH    0.300     13050.0   29.600   5789.273    1.000       4.00    1.973     385.95      5.113     870.00    0.00227
TAXI-IDLE   0.070      3045.0  160.584   1971.791    1.000       7.00   18.735     230.04     81.441     355.25    0.05274

                                TOTAL FOR CYCLE:                        72.172    1985.45               4052.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:         36.350
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:        17.808
                                LBS POLLUTANT/1000K LB TH AT T.O.:       0.289


   MODE   FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     HC        FUEL     LB HC /    ENERGY   LB HC /
             POWER      # TH      RATE      RATE    WT FACTOR    MODE     MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                 MIN.     LBS.       LBS.

TAXI-IDLE   0.070      3045.0   19.548   1971.791    1.000      19.00    6.190     624.40      9.914     964.25    0.00642
TAKEOFF     1.000     43500.0    3.436  17325.500    1.000       0.70    0.040     202.13      0.198     507.50    0.00008
CLIMBOUT    0.850     36975.0    2.009  14807.000    1.000       2.20    0.074     542.92      0.136    1355.75    0.00005
APPROACH    0.300     13050.0    1.485   5789.273    1.000       4.00    0.099     385.95      0.256     870.00    0.00011
TAXI-IDLE   0.070      3045.0   19.548   1971.791    1.000       7.00    2.281     230.04      9.914     355.25    0.00642

                                TOTAL FOR CYCLE:                         8.683    1985.45               4052.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:          4.374
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:         2.143
                                LBS POLLUTANT/1000K LB TH AT T.O.:       0.922


   MODE   FRACTIONAL    POWER   EMISSION    FUEL      USAGE    TIME IN     NOX       FUEL     LB NOX/    ENERGY   LB NOX/
             POWER      # TH      RATE      RATE    WT FACTOR    MODE     MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                 LB/HR     LB/HR                 MIN.     LBS.       LBS.

TAXI-IDLE   0.070      3045.0    3.297   1971.791    1.000      19.00    1.044     624.40      1.672     964.25    0.00108
TAKEOFF     1.000     43500.0  575.381  17325.500    1.000       0.70    6.713     202.13     33.210     507.50    0.01323
CLIMBOUT    0.850     36975.0  403.784  14807.000    1.000       2.20   14.805     542.92     27.270    1355.75    0.01092
APPROACH    0.300     13050.0   49.651   5789.273    1.000       4.00    3.310     385.95      8.576     870.00    0.00380
TAXI-IDLE   0.070      3045.0    3.297   1971.791    1.000       7.00    0.385     230.04      1.672     355.25    0.00108

                                TOTAL FOR CYCLE:                        26.257    1985.45               4052.75
                                LBS POLLUTANT/1K LB FUEL/CYCLE:         13.225
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:         6.479
                                LBS POLLUTANT/1000K LB TH AT T.O.:     154.317
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DATE:   7/28/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ******************************************************************************************

    CAL ID NUMBER:  323    ENGINE TYPE AND MODEL:  JT9D-7                 SERIAL NUMBER:    P-685605

                           RATED THRUST:        45500.

     ENGINE TOTAL TIME:                                      -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                        -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                            -0. HRS
          N2 COMPRESSOR OVERHAUL:                            -0. HRS
          COMBUSTOR CAN REPLACEMENT:                         -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:            -0. HRS
          N1 TURBINE OVERHAUL:                               -0. HRS
          N2 TURBINE OVERHAUL:                               -0. HRS

     FUEL: JP-4                  FUEL H/C RATIO:   2.000

OPERATIONAL DATA *******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   72.80   FINISH   77.00

     ATMOSPHERIC PRESSURE:              START   28.60   FINISH   28.60

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0091

     RELATIVE HUMIDITY:                   -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

 NUMBER OF TESTS:  15

 COMMENTS:

  BURNER CONFIGURATION - 10


  CLOCK     TEST         POWER               ENGINE            MEASURED   GAS GEN     CALC     COMPRESSOR   ENGINE     TURBINE
  TIME      MODE   THRUST,LBS  PERCENT        SPEED              FUEL    AIR FLOW     F/A      DISCHARGE   PRESSURE    INLET
                       OR       RATED          RPM               FLOW     LB/SEC                 TEMP       RATIO      TEMP
                      SHP       T.O.      N1         N2         LB/HR                         DEGREES F      EPR     DEGREES F

 1031.00    1/ 0    3373.00        7    1016.00    4991.00     1719.00    -0.00    0.010000     -0.00        1.02      -0.00
 1041.00    2/ 1    3954.00        8    1099.00    5187.00     1884.00    -0.00    0.010000     -0.00        1.02      -0.00
 1051.00    3/ 2    4368.00        9    1156.00    5317.00     2010.00    -0.00    0.010000     -0.00        1.02      -0.00
 1104.00    4/ 3   45955.00      100    3334.00    7634.00    16571.00    -0.00    0.023000     -0.00        1.46      -0.00
 1112.00    5/ 4   43794.00       96    3270.00    7401.00    15604.00    -0.00    0.022000     -0.00        1.42      -0.00
 1119.00    6/ 5   42510.00       93    3235.00    7382.00    15081.00    -0.00    0.022000     -0.00        1.40      -0.00
 1126.00    7/ 6   40841.00       89    3182.00    7349.00    14356.00    -0.00    0.021000     -0.00        1.38      -0.00
 1133.00    8/ 7   29597.00       65    3143.00    7325.00    13846.00    -0.00    0.021000     -0.00        1.36      -0.00
 1140.00    9/ 8   37742.00       82    3092.00    7289.00    13132.00    -0.00    0.020000     -0.00        1.34      -0.00
 1147.00   10/ 9   36453.00       80    3047.00    7253.00    12588.00    -0.00    0.020000     -0.00        1.32      -0.00
 1154.00   11/10   34632.00       76    2991.00    7216.00    11910.00    -0.00    0.019000     -0.00        1.30      -0.00
 1201.00   12/11   33576.00       73    2955.00    7180.00    11492.00    -0.00    0.019000     -0.00        1.28      -0.00
 1208.00   13/12   32008.00       70    2899.00    7149.00    10896.00    -0.00    0.018000     -0.00        1.26      -0.00
 1215.00   14/13   30465.00       66    2840.00    7102.00    10291.00    -0.00    0.018000     -0.00        1.25      -0.00
 1222.00   15/14   29146.00       64    2788.00    7058.00     9789.00    -0.00    0.018000     -0.00        1.23      -0.00


  POWER    EXHAUST     EXHAUST          CO         CO        THC       NO        NO          NO      ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS          (WET)         2       (WET)     (WET)        2           X
  RATED      TEMP      PRESSURE        PPMV      (WET)      PPMV      PPMV      (WET)       (WET)
  T.O.    DEGREES F      PSIA                  PERCENT V                         PPMV        PPMV

     7      643.00      -0.00        454.10      1.67     180.70     15.90      0.0        15.90      -0.00     -0.00      -0.00
     8      648.00      -0.00        377.90      1.67     122.80     16.10      0.0        16.10      -0.00     -0.00      -0.00
     9      654.00      -0.00        308.80      1.69      85.20     15.30      3.60       29.40      -0.00     -0.00      -0.00
   100     1052.00      -0.00          7.50      3.50       5.90    376.00     19.30      395.30      -0.00     -0.00      -0.00
    96     1027.00      -0.00          4.30      3.37       2.90    369.30     19.80      389.10      -0.00     -0.00      -0.00
    93     1014.00      -0.00          3.10      3.58       5.60    324.70     19.60      344.30      -0.00     -0.00      -0.00
    89      995.00      -0.00          4.00      3.50       4.80    314.50     18.90      333.40      -0.00     -0.00      -0.00
    65      982.00      -0.00          6.50      3.45       4.20    290.80     16.20      307.00      -0.00     -0.00      -0.00
    82      967.00      -0.00          6.10      3.41       4.30    262.60     15.60      278.20      -0.00     -0.00      -0.00
    80      953.00      -0.00         23.20      3.31       0.0     242.20     37.90      280.10      -0.00     -0.00      -0.00
    76      936.00      -0.00         22.60      3.20       0.50    221.30     27.50      248.80      -0.00     -0.00      -0.00
    73      923.00      -0.00         27.90      3.08       1.60    201.60     19.00      220.60      -0.00     -0.00      -0.00
    70      910.00      -0.00         27.30      3.02       2.70    184.50     26.50      211.00      -0.00     -0.00      -0.00
    66      894.00      -0.00         29.20      2.95      25.70    414.00     24.70      438.70      -0.00     -0.00      -0.00
    64      880.00      -0.00         31.50      2.87      20.20    368.00     25.20      392.20      -0.00     -0.00      -0.00


  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC        NO2       CO2        NO        NOX        CO        HC        NO2       CO2        NO        NOX
  RATED    LB/1K     LB/1K     LB/1K     LB/1K      LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR      LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL    LB FUEL   LB FUEL

     7     52.31     11.92      0.0     3022.84      3.01      3.01     89.93     20.49      0.0      5196.26      5.17      5.17
     8     43.87      8.17      0.0     3046.41      3.07      3.07     82.66     15.38      0.0      5739.63      5.78      5.78
     9     35.66      5.63      0.68    3066.26      2.90      5.58     71.67     11.33      1.37     6163.18      5.83     11.21
   100      0.43      0.19      1.81    3136.54     35.23     37.03      7.09      3.19     29.96    51975.66    583.72    613.68
    96      0.25      0.10      1.93    3137.07     35.94     37.86      3.98      1.54     30.07    48950.89    560.78    590.85
    93      0.17      0.18      1.80    3136.98     29.74     31.54      2.61      2.70     27.08    47308.82    448.56    475.64
    89      0.23      0.16      1.77    3136.96     29.47     31.24      3.28      2.25     25.42    45034.14    423.03    448.46
    65      0.38      0.14      1.54    3136.77     27.64     29.18      5.21      1.93     21.32    43431.74    382.70    404.03
    82      0.36      0.14      1.50    3136.79     25.25     26.75      4.69      1.89     19.70    41192.30    331.62    351.32
    80      1.40      0.0       3.75    3135.55     23.99     27.74     17.61      0.0      47.25    39470.25    301.92    349.17
    76      1.41      0.02      2.87    3135.48     22.67     25.49     16.79      0.21     33.55    37343.58    269.98    303.53
    73      1.81      0.06      2.02    3134.74     21.45     23.47     20.77      0.68     23.23    36024.46    246.50    269.73
    70      1.80      0.10      2.88    3134.63     20.02     22.90     19.65      1.11     31.33    34154.93    218.13    249.47
    66      1.97      0.99      2.74    3131.92     45.95     48.69     20.30     10.23     25.21    32230.55    472.85    501.07
    64      2.19      0.80      2.87    3132.10     41.98     44.74     21.42      7.87     28.14    30660.14    410.98    438.01


  POWER          CO                 CO              THC              NO               NO              NO
 PERCENT                              2                                                 2               X
  RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR     LB/1K#TH-HR
  T.O.

     7        26.661          1540.546           6.076            1.533            0.0             1.533
     8        20.905          1451.551           3.891            1.463            0.0             1.463
     9        16.409          1410.984           2.593            1.335            0.314           2.566
   100         0.154          1131.012           0.069           12.702            0.652          13.354
    96         0.091          1117.754           0.035           12.805            0.687          13.491
    93         0.061          1112.887           0.063           10.552            0.637          11.189
    89         0.080          1102.670           0.055           10.358            0.622          10.981
    65         0.176          1467.438           0.065           12.931            0.720          13.651
    82         0.124          1091.418           0.050            8.786            0.522           9.308
    80         0.483          1082.771           0.0              8.283            1.296           9.579
    76         0.485          1078.297           0.006            7.796            0.969           8.764
    73         0.619          1072.923           0.020            7.342            0.692           8.034
    70         0.614          1067.075           0.035            6.815            0.979           7.794
    66         0.667          1058.649           0.336           15.531            0.927          16.458
    64         0.735          1051.950           0.270           14.101            0.966          15.028
   CAL ID NUMBER:  323   ENGINE TYPE AND MODEL: JT9D-7                SERIAL NUMBER:   P-685605

TEST ORGANIZATION:  PRATT & WHITNEY        .

  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      CO        FUEL      LB CO /    ENERGY   LB CO /
            POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.070     3185.0    77.165   1403.093     1.000       19.00    24.436     444.31     54.996    1008.58    0.02423
TAKEOFF     1.000    45500.0     3.611  16342.047     1.000        0.70     0.042     190.66      0.221     530.83    0.00008
CLIMBOUT    0.850    38675.0    15.273  13736.523     1.000        2.20     0.560     503.67      1.112    1418.08    0.00039
APPROACH    0.300    13650.0    32.866   4643.387     1.000        4.00     2.191     309.56      7.078     910.00    0.00241
TAXI-IDLE   0.070     3185.0    77.165   1403.093     1.000        7.00     9.003     163.69     54.996     371.58    0.02423

                               TOTAL FOR CYCLE:                            36.231    1611.89               4239.08
                               LBS POLLUTANT/1K LB FUEL/CYCLE:             22.477
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:             8.547
                               LBS POLLUTANT/1000K LB TH AT T.O.:           0.093

  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      HC        FUEL      LB HC /    ENERGY   LB HC /
            POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.070     3185.0    16.747   1403.093     1.000       19.00     5.303     444.31     11.936    1008.58    0.00526
TAKEOFF     1.000    45500.0     3.992  16342.047     1.000        0.70     0.047     190.66      0.244     530.83    0.00009
CLIMBOUT    0.850    38675.0     3.085  13736.523     1.000        2.20     0.113     503.67      0.225    1418.08    0.00008
APPROACH    0.300    13650.0     2.709   4643.387     1.000        4.00     0.181     309.56      0.583     910.00    0.00020
TAXI-IDLE   0.070     3185.0    16.747   1403.093     1.000        7.00     1.954     163.69     11.936     371.58    0.00526

                               TOTAL FOR CYCLE:                             7.597    1611.89               4239.08
                               LBS POLLUTANT/1K LB FUEL/CYCLE:              4.713
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:             1.792
                               LBS POLLUTANT/1000K LB TH AT T.O.:           1.024

  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     NOX        FUEL      LB NOX/    ENERGY   LB NOX/
            POWER       # TH       RATE      RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.070     3185.0     4.532   1403.093     1.000       19.00     1.435     444.31      3.230    1008.58    0.00142
TAKEOFF     1.000    45500.0   603.415  16342.047     1.000        0.70     7.040     190.66     36.924     530.83    0.01326
CLIMBOUT    0.850    38675.0   402.453  13736.523     1.000        2.20    14.757     503.67     29.298    1418.08    0.01041
APPROACH    0.300    13650.0    44.881   4643.387     1.000        4.00     2.992     309.56      9.666     910.00    0.00329
TAXI-IDLE   0.070     3185.0     4.532   1403.093     1.000        7.00     0.529     163.69      3.230     371.58    0.00142

                               TOTAL FOR CYCLE:                            26.[illegible]2    1611.89               4239.08
                               LBS POLLUTANT/1K LB FUEL/CYCLE:             16.597
                               LBS POLLUTANT/1K LB TH-HR/CYCLE:             6.311
                               LBS POLLUTANT/1000K LB TH AT T.O.:         154.722
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DATE:   7/28/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ************************************************************************************************

    CAL ID NUMBER:  324    ENGINE TYPE AND MODEL:  JT9D-7                    SERIAL NUMBER:    P-685602

                           RATED THRUST:         45500.

    ENGINE TOTAL TIME:                                      -0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                        -0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                            -0. HRS
         N2 COMPRESSOR OVERHAUL:                            -0. HRS
         COMBUSTOR CAN REPLACEMENT:                         -0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:            -0. HRS
         N1 TURBINE OVERHAUL:                               -0. HRS
         N2 TURBINE OVERHAUL:                               -0. HRS

    FUEL: JP-4                FUEL H/C RATIO:   2.000

OPERATIONAL DATA *******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   80.00   FINISH   79.90

     ATMOSPHERIC PRESSURE:              START   29.85   FINISH   29.85

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0082

     RELATIVE HUMIDITY:                     -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   8

COMMENTS:

 BURNER CONFIGURATION - 10


 CLOCK      TEST          POWER                 ENGINE            MEASURED    GAS GEN      CALC    COMPRESSOR     ENGINE      TURBINE
  TIME      MODE    THRUST,LBS  PERCENT          SPEED               FUEL    AIR FLOW      F/A     DISCHARGE    PRESSURE       INLET
                        OR       RATED            RPM                FLOW     LB/SEC                  TEMP         RATIO        TEMP
                       SHP       T.O.        N1          N2         LB/HR                          DEGREES F       EPR      DEGREES F

1609.00     1/ 0    45787.00      100     3341.00     7478.00    16549.00     -0.00    0.023000      -0.00         1.45        -0.00
1616.00     2/ 1    42070.00       92     3233.00     7411.00    14921.00     -0.00    0.022000      -0.00         1.40        -0.00
1623.00     3/ 2    39345.00       86     3152.00     7349.00    13827.00     -0.00    0.021000      -0.00         1.36        -0.00
1630.00     4/ 3    35544.00       78     3036.00     7260.00    12307.00     -0.00    0.020000      -0.00         1.31        -0.00
1637.00     5/ 4    30448.00       66     2853.00     7125.00    10347.00     -0.00    0.018000      -0.00         1.25        -0.00
1638.00     6/ 5     3207.00        7     1000.00     5017.00     1595.00     -0.00    0.010000      -0.00         1.02        -0.00
1648.00     7/ 6     3570.00        7     1056.00     5163.00     1797.00     -0.00    0.010000      -0.00         1.02        -0.00
1653.00     8/ 7     4009.00        8     1117.00     5281.00     1926.00     -0.00    0.010000      -0.00         1.02        -0.00


 POWER     EXHAUST       EXHAUST          CO          CO         THC        NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
PERCENT      GAS           GAS          (WET)         2        (WET)     (WET)         2           X
 RATED       TEMP       PRESSURE        PPMV       (WET)       PPMV       PPMV      (WET)       (WET)
  T.O.    DEGREES F       PSIA                   PERCENT V                           PPMV        PPMV

  100      1080.00       -0.00          7.30        3.92        8.80     442.70     26.40      469.10      -0.00      -0.00       -0.00
   92      1038.00       -0.00          6.50        3.72       18.10     377.90     23.80      401.70      -0.00      -0.00       -0.00
   86      1009.00       -0.00          6.10        3.57       13.30     319.90     19.70      339.60      -0.00      -0.00       -0.00
   78       970.00       -0.00          5.70        3.35        9.50    -256.10     16.70      272.80      -0.00      -0.00       -0.00
   66       916.00       -0.00          6.40        3.10        7.40       0.0      13.80       13.80      -0.00      -0.00       -0.00
    7       730.00       -0.00        410.60        1.60      152.60      10.40     15.00       45.40      -0.00      -0.00       -0.00
    7       679.00       -0.00        351.20        1.63      114.70      11.50     16.30       27.80      -0.00      -0.00       -0.00
    8       682.00       -0.00        314.60        1.67       92.80      12.60     17.10       29.70      -0.00      -0.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2        NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR      LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  100       0.37      0.26      2.21   3136.46     37.03     39.24      6.15      4.25     36.54   51905.22    612.80    649.34
   92       0.35      0.56      2.10   3135.67     33.30     35.40      5.20      8.30     31.29   46787.35    496.87    528.16
   86       0.34      0.43      1.81   3136.04     29.38     31.19      4.72      5.89     25.01   43362.03    406.20    431.21
   78       0.34      0.32      1.63   3136.32     25.06     26.70      4.18      3.99     20.12   38598.70    308.47    328.59
   66       0.41      0.27      1.46   3136.35      0.0       1.46      4.26      2.82     15.10   32451.80      0.0      15.10
    7      49.51     10.54      2.97   3031.05      2.06      8.99     78.96     16.81      4.74    4834.52      3.29     14.34
    7      41.83      7.82      3.19   3050.55      2.25      5.44     75.17     14.06      5.73    5481.94      4.04      9.77
    8      36.72      6.20      3.28   3063.02      2.42      5.69     70.73     11.95      6.31    5899.38      4.65     10.97


 POWER          CO                CO              THC               NO               NO               NO
PERCENT                            2                                                  2                X
 RATED      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

  100         0.134          1133.626            0.093           13.384            0.798           14.182
   92         0.124          1112.131            0.197           11.811            0.744           12.554
   86         0.120          1102.098            0.150           10.324            0.636           10.960
   78         0.118          1095.942            0.112            8.679            0.566            9.245
   66         0.140          1065.811            0.093            0.0              0.496            0.496
    7        24.622          1507.491            5.241            1.024            1.477            4.472
    7        21.057          1535.531            3.939            1.133            1.605            2.738
    8        17.643          1471.534            2.981            1.161            1.575            2.736
    CAL ID NUMBER:  324   ENGINE TYPE AND MODEL: JT9D-7                SERIAL NUMBER:   P-685602

TEST ORGANIZATION:  PRATT & WHITNEY

   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY    LB CO /
              POWER       # TH      RATE        RATE     WT FACTOR    MODE       MASS      MASS   1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR       LB/HR                 MIN.       LBS.      LBS.

TAXI-IDLE    0.070      3185.0    83.413    1633.519     1.000       19.00     26.414     517.28     51.064   1008.58    0.02619
TAKEOFF      1.000     45500.0     8.074   16478.223     1.000        0.70      0.094     192.25      0.490    530.83    0.00018
CLIMBOUT     0.850     38675.0     6.686   13645.398     1.000        2.20      0.245     500.33      0.490   1418.08    0.00017
APPROACH     0.300     13650.0    21.469    4951.391     1.000        4.00      1.431     330.09      4.336    910.00    0.00157
TAXI-IDLE    0.070      3185.0    83.413    1633.519     1.000        7.00      9.732     190.58     51.064    371.58    0.02619

                                 TOTAL FOR CYCLE:                            37.916    1730.53               4239.08
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             21.910
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             8.944
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           0.207


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY    LB HC /
              POWER       # TH      RATE        RATE     WT FACTOR    MODE       MASS      MASS   1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR       LB/HR                 MIN.       LBS.      LBS.

TAXI-IDLE    0.070      3185.0    17.412    1633.519     1.000       19.00      5.514     517.28     10.659   1008.58    0.00547
TAKEOFF      1.000     45500.0     4.900   16478.223     1.000        0.70      0.057     192.25      0.297    530.83    0.00011
CLIMBOUT     0.850     38675.0     4.781   13645.398     1.000        2.20      0.175     500.33      0.350   1418.08    0.00012
APPROACH     0.300     13650.0     3.104    4951.391     1.000        4.00      0.207     330.09      0.627    910.00    0.00023
TAXI-IDLE    0.070      3185.0    17.412    1633.519     1.000        7.00      2.031     190.58     10.659    371.58    0.00547

                                 TOTAL FOR CYCLE:                             7.984    1730.53               4239.08
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:              4.614
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             1.884
                                 LBS POLLUTANT/1000K LB TH AT T.O.:           1.256


   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      NOX       FUEL     LB NOX/     ENERGY    LB NOX/
              POWER       # TH      RATE        RATE     WT FACTOR    MODE       MASS      MASS   1K LB FUEL   # TH-HR   # TH-HR
                                    LB/HR       LB/HR                 MIN.       LBS.      LBS.

TAXI-IDLE    0.070      3185.0     8.688    1633.519     1.000       19.00      2.751     517.28      5.319   1008.58    0.00273
TAKEOFF      1.000     45500.0   654.127   16478.223     1.000        0.70      7.631     192.25     39.696    530.83    0.01438
CLIMBOUT     0.850     38675.0   414.190   13645.398     1.000        2.20     15.187     500.33     30.354   1418.08    0.01071
APPROACH     0.300     13650.0    57.925    4951.391     1.000        4.00      3.862     330.09     11.699    910.00    0.00424
TAXI-IDLE    0.070      3185.0     8.688    1633.519     1.000        7.00      1.014     190.58      5.319    371.58    0.00273

                                 TOTAL FOR CYCLE:                            30.445    1730.53               4239.06
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:             17.593
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:             7.182
                                 LBS POLLUTANT/1000K LB TH AT T.O.:         167.725
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DATE: 7/29/71

TEST ORGANIZATION: PRATT & WHITNEY

ENGINE SUPPLIER: PRATT AND WHITNEY

ENGINE DATA **

CAL ID NUMBER: 325 ENGINE TYPE AND MODEL: JT9D-7 SERIAL NUMBER: P-663071

RATED THRUST: 45500.

ENGINE TOTAL TIME: -0. HRS

TIME SINCE HOT SECTION OVERHAUL: -0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: -0. HRS
N2 COMPRESSOR OVERHAUL: -0. HRS
COMBUSTOR CAN REPLACEMENT: -0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: -0. HRS
N1 TURBINE OVERHAUL: -0. HRS
N2 TURBINE OVERHAUL: 0. HRS

FUEL: JP-4 FUEL H/C RATIO: 2.000

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 79.70 FINISH 75.60

ATMOSPHERIC PRESSURE: START 29.85 FINISH 29.85

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0154

RELATIVE HUMIDITY: -0.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 2.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 8

COMMENTS:

BURNER CONFIGURATION - 10

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1303.00	1/ 0	2626.00	5	918.00	4860.00	1555.00	-0.00	0.010000	-0.00	1.01	-0.00
1329.00	2/ 1	3205.00	7	1015.00	5093.00	1707.00	-0.00	0.009000	-0.00	1.02	-0.00
1338.00	3/ 2	3595.00	7	1071.00	5218.00	1811.00	-0.00	0.009000	-0.00	1.02	-0.00
1352.00	4/ 3	43656.00	95	3290.00	7558.00	15364.00	-0.00	0.021000	-0.00	1.43	-0.00
1413.00	5/ 4	32599.00	71	2939.00	7325.00	10998.00	-0.00	0.017000	-0.00	1.28	-0.00
1947.00	6/ 5	30066.00	66	2828.00	7189.00	9912.00	-0.00	0.016000	-0.00	1.24	-0.00
2007.00	7/ 6	36393.00	79	3053.00	7395.00	12323.00	-0.00	0.018000	-0.00	1.32	-0.00
2020.00	8/ 7	39943.00	87	3165.00	7490.00	13712.00	-0.00	0.019000	-0.00	1.37	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
5	677.00	-0.00	572.70	1.74	401.90	9.60	7.20	16.80	-0.00	-0.00	-0.00
7	671.00	-0.00	473.70	1.73	280.10	9.10	10.60	19.70	-0.00	-0.00	-0.00
7	668.00	-0.00	429.90	1.75	226.50	8.80	12.90	21.70	-0.00	-0.00	-0.00
95	1052.00	-0.00	12.00	3.97	5.20	265.60	17.30	282.90	-0.00	-0.00	-0.00
71	932.00	-0.00	18.10	3.40	4.10	209.10	16.70	225.80	-0.00	-0.00	-0.00
66	887.00	-0.00	21.20	2.80	2.10	167.30	6.20	273.50	-0.00	-0.00	-0.00
79	956.00	-0.00	16.10	3.32	0.80	204.90	14.60	219.50	-0.00	-0.00	-0.00
87	1003.00	-0.00	12.20	3.51	1.20	219.20	15.40	234.60	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
5	62.24	25.07	1.29	2971.32	1.71	3.00	96.79	38.90	2.00	4620.39	2.66	4.66
7	52.40	17.74	1.93	3006.73	1.65	3.58	89.44	30.29	3.29	5132.49	2.92	6.11
7	47.28	14.27	2.33	3024.31	1.59	3.92	85.63	25.84	4.22	5477.07	2.88	7.10
95	0.60	0.15	1.43	3136.39	21.94	23.36	9.27	2.30	21.95	48187.43	337.02	358.97
71	1.06	0.14	1.61	3135.70	20.16	21.77	11.68	1.52	17.71	34486.40	221.72	239.43
66	1.51	0.09	0.73	3135.14	19.58	32.01	14.97	0.85	7.19	31075.46	194.11	317.32
79	0.97	0.03	1.44	3136.15	20.23	21.68	11.93	0.34	17.77	38646.75	249.34	267.11
87	0.69	0.04	1.44	3136.55	20.48	21.92	9.51	0.54	19.73	43008.33	280.78	300.51

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_x LB/1K#TH-HR
5	36.857	1759.480	14.814	1.015	0.761	1.776
7	27.907	1601.407	9.451	0.881	1.026	1.906
7	23.820	1523.509	7.188	0.801	1.174	1.975
95	0.217	1103.799	0.053	7.720	0.503	8.223
71	0.358	1057.898	0.047	6.801	0.543	7.345
66	0.498	1033.575	0.028	6.456	0.239	10.554
79	0.328	1061.978	0.009	6.851	0.488	7.340
87	0.238	1076.743	0.013	7.030	0.494	7.523

CAL ID NUMBER: 325 ENGINE TYPE AND MODEL: JT9D-7 SERIAL NUMBER: P-663071

TEST ORGANIZATION: PRATT & WHITNEY

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	CO MASS LBS.	FUEL MASS LBS.	LB CO / 1K LB FUEL	ENERGY # TH-HR	LB CO / # TH-HR
TAXI-IDLE	0.070	3185.0	98.475	1824.762	1.000	19.00	31.184	577.84	53.966	1008.58	0.03092
TAKEOFF	1.000	45500.0	12.982	16079.000	1.000	0.70	0.151	187.59	0.807	530.83	0.00029
CLIMBOUT	0.850	38675.0	13.323	13221.047	1.000	2.20	0.489	484.77	1.008	1418.08	0.00034
APPROACH	0.300	13650.0	36.413	4969.230	1.000	4.00	2.428	331.28	7.328	910.00	0.00267
TAXI-IDLE	0.070	3185.0	98.475	1824.762	1.000	7.00	11.489	212.89	53.966	371.58	0.03092
TOTAL FOR CYCLE:							45.740	1794.37		4239.08	
LBS POLLUTANT/1K LB FUEL/CYCLE:							25.491				
LBS POLLUTANT/1K LB TH-HR/CYCLE:							10.790				
LBS POLLUTANT/1000K LB TH AT T.O.:							0.333				

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	HC MASS LBS.	FUEL MASS LBS.	LB HC / 1K LB FUEL	ENERGY # TH-HR	LB HC / # TH-HR
TAXI-IDLE	0.070	3185.0	31.437	1824.762	1.000	19.00	9.955	577.84	17.228	1008.58	0.00987
TAKEOFF	1.000	45500.0	0.0	16079.000	1.000	0.70	0.0	187.59	0.0	530.83	0.0
CLIMBOUT	0.850	38675.0	0.404	13221.047	1.000	2.20	0.015	484.77	0.031	1418.08	0.00001
APPROACH	0.300	13650.0	3.708	4969.230	1.000	4.00	0.247	331.28	0.746	910.00	0.00027
TAXI-IDLE	0.070	3185.0	31.437	1824.762	1.000	7.00	3.668	212.89	17.228	371.58	0.00987
TOTAL FOR CYCLE:							13.885	1794.37		4239.08	
LBS POLLUTANT/1K LB FUEL/CYCLE:							7.738				
LBS POLLUTANT/1K LB TH-HR/CYCLE:							3.275				
LBS POLLUTANT/1000K LB TH AT T.O.:							0.0				

MODE	FRACTIONAL POWER	POWER # TH	EMISSION RATE LB/HR	FUEL RATE LB/HR	USAGE WT FACTOR	TIME IN MODE MIN.	NOX MASS LBS.	FUEL MASS LBS.	LB NOX/ 1K LB FUEL	ENERGY # TH-HR	LB NOX/ # TH-HR
TAXI-IDLE	0.070	3185.0	9.403	1824.762	1.000	19.00	2.978	577.84	5.153	1008.58	0.00295
TAKEOFF	1.000	45500.0	578.542	16079.000	1.000	0.70	6.750	187.59	35.981	530.83	0.01272
CLIMBOUT	0.850	38675.0	402.485	13221.047	1.000	2.20	14.758	484.77	30.443	1418.08	0.01041
APPROACH	0.300	13650.0	61.486	4969.230	1.000	4.00	4.099	331.28	12.373	910.00	0.00450
TAXI-IDLE	0.070	3185.0	9.403	1824.762	1.000	7.00	1.097	212.89	5.153	371.58	0.00295
TOTAL FOR CYCLE:							29.681	1794.37		4239.08	
LBS POLLUTANT/1K LB FUEL/CYCLE:							16.541				
LBS POLLUTANT/1K LB TH-HR/CYCLE:							7.002				
LBS POLLUTANT/1000K LB TH AT T.O.:							148.344				

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DATE:   8/ 5/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  326    ENGINE TYPE AND MODEL:  JT9D-7                     SERIAL NUMBER:     P685614

                           RATED THRUST:        45500.

     ENGINE TOTAL TIME:                                    -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          -0. HRS
          N2 COMPRESSOR OVERHAUL:                          -0. HRS
          COMBUSTOR CAN REPLACEMENT:                       -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          -0. HRS
          N1 TURBINE OVERHAUL:                             -0. HRS
          N2 TURBINE OVERHAUL:                             -0. HRS

     FUEL: JP-4                 FUEL H/C RATIO:   2.000

OPERATIONAL DATA *******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    76.00   FINISH   74.90

     ATMOSPHERIC PRESSURE:              START    29.85   FINISH   29.82

     INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0074

     RELATIVE HUMIDITY:                        -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

     SAMPLE LINE TRANSPORT TIME, SEC:     1.00

NUMBER OF TESTS:    5

COMMENTS:

 BURNER CONFIGURATION - B/M


 CLOCK      TEST            POWER                 ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE       TURBINE
  TIME      MODE     THRUST,LBS  PERCENT           SPEED              FUEL      AIR FLOW      F/A     DISCHARGE    PRESSURE      INLET
                        OR        RATED             RPM               FLOW      LB/SEC                  TEMP        RATIO        TEMP
                        SHP       T.O.        N1          N2          LB/HR                           DEGREES F      EPR       DEGREES F

1611.00     1/ 0     4559.00        10     1276.00    5549.00      2271.00      -0.00     0.010000      -0.00         1.03        -0.00
1624.00     2/ 1    34868.00        76     3131.00    7336.00     13605.00      -0.00     0.020000      -0.00         1.36        -0.00
1637.00     3/ 2    41250.00        90     3271.00    7620.00     16411.00      -0.00     0.022000      -0.00         1.46        -0.00
1835.00     4/ 3     4562.00        10     1276.00    5544.00      2273.00      -0.00     0.010000      -0.00         1.03        -0.00
1842.00     5/ 4     2905.00         6     1023.00    5036.00      1720.00      -0.00     0.010000      -0.00         1.02        -0.00


 POWER     EXHAUST      EXHAUST         CO          CO        THC       NO        NO        NO      ALDEHYDES    SMOKE    PARTICULATES
PERCENT     GAS          GAS           (WET)         2        (WET)     (WET)       2         X
 RATED      TEMP       PRESSURE        PPMV       (WET)       PPMV      PPMV     (WET)     (WET)
 T.O.     DEGREES F      PSIA                   PERCENT V                        PPMV      PPMV

   10      670.00       -0.00        256.20       1.71      47.60      4.90     16.20     21.10     -0.00       -0.00       -0.00
   76      980.00       -0.00          3.40       3.39       1.10    272.30     17.50    289.80     -0.00       -0.00       -0.00
   90     1054.00       -0.00          3.10       3.57       0.40    421.10     25.30    446.40     -0.00       -0.00       -0.00
   10      470.00       -0.00        271.00       1.65      56.00     16.10     14.90     31.00     -0.00       -0.00       -0.00
    6      659.00       -0.00        425.70       1.38     141.90      0.30      4.80      5.10     -0.00       -0.00       -0.00


 POWER     MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
PERCENT       CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
 RATED      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
 T.O.      LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   10       29.40       3.13       3.05    3082.97       0.92       3.98      66.76       7.10       6.93    7001.43       2.10       9.03
   76        0.20       0.04       1.69    3137.33      26.34      28.04       2.72       0.50      23.03   42683.35     358.42     381.45
   90        0.17       0.01       2.32    3137.44      38.69      41.01       2.85       0.21      38.15   51488.46     634.91     673.05
   10       32.16       3.81       2.90    3076.77       3.14       6.04      73.10       8.65       6.60    6993.49       7.13      13.74
    6       59.17      11.30       1.10    3013.79       0.07       1.16     101.77      19.43       1.88    5183.71       0.12       2.00


 POWER          CO                CO                THC                NO                NO                NO
PERCENT                            2                                                      2                 X
 RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

   10         14.644          1535.737             1.558             0.460             1.571             1.981
   76          0.078          1224.141             0.014            10.279             0.661            10.940
   90          0.069          1248.206             0.005            15.392             0.925            16.316
   10         16.025          1532.988             1.896             1.564             1.447             3.011
    6         35.033          1794.410             6.688             0.041             0.649             0.689
    CAL ID NUMBER:  326   ENGINE TYPE AND MODEL: JT9D-7                  SERIAL NUMBER:   P685614

TEST ORGANIZATION:  PRATT & WHITNEY


   MODE   FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     CO        FUEL    LB CO /    ENERGY   LB CO /
            POWER       # TH      RATE      RATE     WT FACTOR    MODE     MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                 MIN.     LBS.       LBS.

TAXI-IDLE   0.070     3185.0    90.684   1643.798     1.000      19.00   28.717     520.54     55.167   1008.58    0.02847
TAKEOFF     1.000    45500.0     6.516  18075.172     1.000       0.70    0.076     210.88      0.361    530.83    0.00014
CLIMBOUT    0.850    38675.0     9.465  15166.035     1.000       2.20    0.347     556.09      0.624   1418.08    0.00024
APPROACH    0.300    13650.0    38.765   5470.563     1.000       4.00    2.584     364.70      7.086    910.00    0.00284
TAXI-IDLE   0.070     3185.0    90.684   1643.798     1.000       7.00   10.580     191.78     55.167    371.58    0.02847

                                TOTAL FOR CYCLE:                         42.304    1843.98              4239.08
                                LBS POLLUTANT/1K LB FUEL/CYCLE:          22.942
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:          9.979
                                LBS POLLUTANT/1000K LB TH AT T.O.:        0.167


   MODE   FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     HC        FUEL    LB HC /    ENERGY   LB HC /
            POWER       # TH      RATE      RATE     WT FACTOR    MODE     MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                 MIN.     LBS.       LBS.

TAXI-IDLE   0.070     3185.0    14.615   1643.798     1.000      19.00    4.628     520.54      8.891   1008.58    0.00459
TAKEOFF     1.000    45500.0     0.212  18075.172     1.000       0.70    0.002     210.88      0.012    530.83    0.00000
CLIMBOUT    0.850    38675.0     0.879  15166.035     1.000       2.20    0.032     556.09      0.058   1418.08    0.00002
APPROACH    0.300    13650.0     2.122   5470.563     1.000       4.00    0.141     364.70      0.388    910.00    0.00016
TAXI-IDLE   0.070     3185.0    14.615   1643.798     1.000       7.00    1.705     191.78      8.891    371.58    0.00459

                                TOTAL FOR CYCLE:                          6.509    1843.98              4239.08
                                LBS POLLUTANT/1K LB FUEL/CYCLE:           3.530
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:          1.536
                                LBS POLLUTANT/1000K LB TH AT T.O.:        0.054


   MODE   FRACTIONAL    POWER   EMISSION    FUEL       USAGE    TIME IN     NOX       FUEL    LB NOX/    ENERGY   LB NOX/
            POWER       # TH      RATE      RATE     WT FACTOR    MODE     MASS       MASS   1K LB FUEL  # TH-HR  # TH-HR
                                  LB/HR     LB/HR                 MIN.     LBS.       LBS.

TAXI-IDLE   0.070     3185.0     3.624   1643.798     1.000      19.00    1.148     520.54      2.205   1008.58    0.00114
TAKEOFF     1.000    45500.0   882.182  18075.172     1.000       0.70   10.292     210.88     48.806    530.83    0.01939
CLIMBOUT    0.850    38675.0   526.113  15166.035     1.000       2.20   19.291     556.09     34.690   1418.08    0.01360
APPROACH    0.300    13650.0    52.943   5470.563     1.000       4.00    3.530     364.70      9.678    910.00    0.00388
TAXI-IDLE   0.070     3185.0     3.624   1643.798     1.000       7.00    0.423     191.78      2.205    371.58    0.00114

                                TOTAL FOR CYCLE:                         34.683    1843.98              4239.08
                                LBS POLLUTANT/1K LB FUEL/CYCLE:          18.809
                                LBS POLLUTANT/1K LB TH-HR/CYCLE:          8.182
                                LBS POLLUTANT/1000K LB TH AT T.O.:      226.200
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DATE:   8/ 5/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ***********************************************************************************************

     CAL ID NUMBER:  355    ENGINE TYPE AND MODEL:  JT9D-7                  SERIAL NUMBER:     P685614

                             RATED THRUST:         45500.

     ENGINE TOTAL TIME:                                  -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        -0. HRS
          N2 COMPRESSOR OVERHAUL:                        -0. HRS
          COMBUSTOR CAN REPLACEMENT:                     -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        -0. HRS
          N1 TURBINE OVERHAUL:                           -0. HRS
          N2 TURBINE OVERHAUL:                           -0. HRS

     FUEL: JP-4                  FUEL H/C RATIO:   2.000

 OPERATIONAL DATA *******************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   76.30   FINISH   74.90

      ATMOSPHERIC PRESSURE:              START   29.87   FINISH   29.87

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0074

      RELATIVE HUMIDITY:                        -0.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

      SAMPLE LINE TRANSPORT TIME, SEC:    1.00

  NUMBER OF TESTS:   5

  COMMENTS:

   EXHAUST GAS PRESSURE IN INCHES HG


  CLOCK     TEST          POWER              ENGINE            MEASURED   GAS GEN     CALC    COMPRESSOR    ENGINE      TURBINE
   TIME     MODE    THRUST,LBS  PERCENT       SPEED              FUEL    AIR FLOW     F/A    DISCHARGE    PRESSURE      INLET
                        OR       RATED         RPM               FLOW     LB/SEC                TEMP        RATIO        TEMP
                       SHP       T.O.      N1         N2        LB/HR                        DEGREES F      EPR       DEGREES F

 1612.00    1/ 0    5325.00      11     1276.00   5453.00    2224.00     -0.00    0.008600     -0.00         1.03         -0.00
 1624.00    2/ 1   39014.00      85     3131.00   7220.00   13464.00     -0.00    0.017000     -0.00         1.36         -0.00
 1632.00    3/ 2   45834.00     100     3271.00   7405.00   16252.00     -0.00    0.018000     -0.00         1.46         -0.00
 1030.00    4/ 3    5330.00      11     1276.00   5457.00    2230.00     -0.00    0.008600     -0.00         1.03         -0.00
 1043.00    5/ 4    3397.00       7     1023.00   4958.00    1685.00     -0.00    0.008600     -0.00         1.02         -0.00


  POWER    EXHAUST      EXHAUST        CO        CO       THC      NO       NO       NO    ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS         (WET)       2       (WET)    (WET)      2        X
  RATED      TEMP       PRESSURE      PPMV     (WET)      PPMV     PPMV    (WET)    (WET)
  T.O.    DEGREES F       PSIA              PERCENT V                      PPMV     PPMV

   11       670.00       -0.00       256.00     1.71     47.60     7.90    16.20    21.10     -0.00     -0.00      -0.00
   85       980.00       -0.00         3.40     3.39      1.10   272.30    17.50   289.80     -0.00     -0.00      -0.00
  100      1054.00       -0.00         3.10     3.57      0.40   421.10    25.30   446.40     -0.00     -0.00      -0.00
   11       670.00       -0.00       271.00     1.65     56.00    16.10    14.90    31.00     -0.00     -0.00      -0.00
    7       659.00       -0.00       425.70     1.38    141.90     0.30     7.80     5.10     -0.00     -0.00      -0.00


  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   11       29.38      3.13      3.05   3083.01      1.49      3.98     65.33      6.96      6.79   6856.61      3.31      8.84
   85        0.20      0.04      1.69   3137.33     26.34     28.04      2.70      0.50     22.80  42240.99    354.70    377.50
  100        0.17      0.01      2.32   3137.44     38.69     41.01      2.82      0.21     37.78  50989.62    628.75    666.53
   11       32.16      3.81      2.90   3076.77      3.14      6.04     71.72      8.49      6.48   6861.19      7.00     13.48
    7       59.17     11.30      1.78   3013.79      0.07      1.16     99.70     19.03      3.00   5078.23      0.12      1.96


  POWER          CO                CO              THC               NO               NO               NO
 PERCENT                            2                                                  2                X
  RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

   11          12.269         1287.626           1.306            0.622            1.275            1.661
   85           0.069         1082.714           0.013            9.092            0.584            9.676
  100           0.061         1112.485           0.035           13.718            0.824           14.542
   11          13.456         1287.277           1.593            1.313            1.215            2.528
    7          29.350         1494.917           5.603            0.034            0.883            0.578
   CAL ID NUMBER:  355   ENGINE TYPE AND MODEL: JT9D-7                     SERIAL NUMBER:   P685614

TEST ORGANIZATION:  PRATT & WHITNEY

  MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      CO        FUEL      LB CO /     ENERGY    LB CO /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE    0.070      3185.0    79.733    1530.134     1.000      19.00     25.249     484.54     52.109    1008.58    0.02503
TAKEOFF      1.000     45500.0     1.096   16160.711     1.000       0.70      0.013     188.54      0.068     530.83    0.00002
CLIMBOUT     0.850     38675.0     9.650   13375.535     1.000       2.20      0.354     490.44      0.721    1418.08    0.00025
APPROACH     0.300     13650.0    58.261    4443.086     1.000       4.00      3.884     296.21     13.113     910.00    0.00427
TAXI-IDLE    0.070      3185.0    79.733    1530.134     1.000       7.00      9.302     178.52     52.109     371.58    0.02503

                                  TOTAL FOR CYCLE:                           38.802    1638.24                4239.08
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            23.685
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:            9.153
                                  LBS POLLUTANT/1000K LB TH AT T.O.:          0.028


  MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN      HC        FUEL      LB HC /     ENERGY    LB HC /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE    0.070      3185.0    16.950    1530.134     1.000      19.00      5.368     484.54     11.078    1008.58    0.00532
TAKEOFF      1.000     45500.0     0.970   16160.711     1.000       0.70      0.011     188.54      0.060     530.83    0.00002
CLIMBOUT     0.850     38675.0     0.803   13375.535     1.000       2.20      0.029     490.44      0.060    1418.08    0.00002
APPROACH     0.300     13650.0     4.438    4443.086     1.000       4.00      0.296     296.21      0.999     910.00    0.00033
TAXI-IDLE    0.070      3185.0    16.950    1530.134     1.000       7.00      1.978     178.52     11.078     371.58    0.00532

                                  TOTAL FOR CYCLE:                            7.682    1638.24                4239.08
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:             4.689
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:            1.812
                                  LBS POLLUTANT/1000K LB TH AT T.O.:          0.249


  MODE    FRACTIONAL     POWER    EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL      LB NOX/     ENERGY    LB NOX/
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS    1K LB FUEL   # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE    0.070      3185.0     4.811    1530.134     1.000      19.00      1.523     484.54      3.144    1008.58    0.00151
TAKEOFF      1.000     45500.0   641.065   16160.711     1.000       0.70      7.479     188.54     39.668     530.83    0.01409
CLIMBOUT     0.850     38675.0   379.293   13375.535     1.000       2.20     13.907     490.44     28.357    1418.08    0.00981
APPROACH     0.300     13650.0    52.591    4443.086     1.000       4.00      3.506     296.21     11.837     910.00    0.00385
TAXI-IDLE    0.070      3185.0     4.811    1530.134     1.000       7.00      0.561     178.52      3.144     371.58    0.00151

                                  TOTAL FOR CYCLE:                           26.977    1638.24                4239.08
                                  LBS POLLUTANT/1K LB FUEL/CYCLE:            16.467
                                  LBS POLLUTANT/1K LB TH-HR/CYCLE:            6.364
                                  LBS POLLUTANT/1000K LB TH AT T.O.:        164.376
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DATE:  6/10/71

TEST ORGANIZATION:  AIRESEARCH

ENGINE SUPPLIER:    AIRESEARCH

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:    29     ENGINE TYPE AND MODEL:  TFE 731-2                SERIAL NUMBER:     7305-2

                                  RATED THRUST:          2800.

     ENGINE TOTAL TIME:                                          0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                            0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                                0. HRS
          N2 COMPRESSOR OVERHAUL:                                0. HRS
          COMBUSTOR CAN REPLACEMENT:                             0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:                0. HRS
          N1 TURBINE OVERHAUL:                                   0. HRS
          N2 TURBINE OVERHAUL:                                   0. HRS

     FUEL: AV KEROS                FUEL H/C RATIO:    1.928

OPERATIONAL DATA ***************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    91.00    FINISH    91.00

     ATMOSPHERIC PRESSURE:              START    28.55    FINISH    28.55

     INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0036

     RELATIVE HUMIDITY:                      10.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   6

COMMENTS:


  CLOCK      TEST            POWER                   ENGINE                MEASURED    GAS GEN      CALC      COMPRESSOR      ENGINE        TURBINE
  TIME       MODE     THRUST,LBS  PERCENT             SPEED                  FUEL      AIR FLOW      F/A      DISCHARGE      PRESSURE        INLET
                          OR       RATED               RPM                   FLOW       LB/SEC                   TEMP          RATIO          TEMP
                          SHP      T.O.         N1           N2              LB/HR                             DEGREES F        EPR         DEGREES F

   -0.00     1/ 0      193.00         6     5760.00   16800.00          177.00        4.87     0.010900        -0.00         -0.00           -0.00
   -0.00     2/ 1      406.00        14     8470.00   21070.00          285.00        7.58     0.011300        -0.00         -0.00           -0.00
   -0.00     6/ 2     1045.00        37    13040.00   25370.00          587.00       14.21     0.012400        -0.00         -0.00           -0.00
   -0.00    11/ 6     1637.00        58    15710.00   27020.00          858.00       19.08     0.013500        -0.00         -0.00           -0.00
   -0.00    16/11     2222.00        79    17650.00   27960.00         1150.00       23.79     0.014500        -0.00         -0.00           -0.00
   -0.00    20/16     2605.00        93    18560.00   28430.00         1330.00       26.60     0.015000        -0.00         -0.00           -0.00


  POWER     EXHAUST       EXHAUST         CO         CO          THC       NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
 PERCENT      GAS           GAS          (WET)        2         (WET)     (WET)        2           X
  RATED      TEMP        PRESSURE        PPMV       (WET)       PPMV      PPMV       (WET)       (WET)
  T.O.    DEGREES F        PSIA                   PERCENT V                          PPMV        PPMV

    6       854.00        -0.00         463.40       2.03      253.80      6.20       7.70       13.90      -0.00       -0.00       -0.00
   14       945.00        -0.00         263.60       2.20       84.70     14.50       6.50       21.10      -0.00       -0.00       -0.00
   37      1171.00        -0.00         149.30       2.60       28.90     34.50       8.00       42.60      -0.00       -0.00       -0.00
   58      1329.00        -0.00          65.50       2.86        3.90     58.00       6.80       64.80      -0.00       -0.00       -0.00
   79      1461.00        -0.00          37.70       2.93        1.20     84.60       5.80       90.40      -0.00       -0.00       -0.00
   93      1537.00        -0.00          24.70       3.03        0.80    110.30       6.20      116.50      -0.00       -0.00       -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2        NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    6        44.26     13.88      1.21   3046.44      0.97      2.18      7.83      2.46      0.21    539.22      0.17      0.39
   14        23.68      4.36      0.96   3104.91      2.14      3.11      6.75      1.24      0.27    884.90      0.61      0.89
   37        11.45      1.27      1.01   3132.59      4.35      5.37      6.72      0.75      0.59   1838.83      2.55      3.15
   58         4.59      0.16      0.78   3146.43      6.67      7.45      3.93      0.13      0.67   2699.64      5.72      6.39
   79         2.58      0.05      0.65   3149.88      9.51     10.16      2.97      0.05      0.75   3622.36     10.93     11.68
   93         1.64      0.03      0.67   3151.41     11.99     12.67      2.17      0.04      0.90   4191.38     15.95     16.85


  POWER          CO                 CO                THC                 NO                 NO                 NO
 PERCENT                             2                                                        2                  X
  RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
  T.O.

    6          40.591           2793.881             12.732              0.892              1.108              2.000
   14          16.621           2179.554              3.059              1.502              0.673              2.185
   37           6.431           1759.650              0.713              2.441              0.566              3.014
   58           2.404           1649.137              0.082              3.496              0.410              3.906
   79           1.335           1630.227              0.024              4.921              0.337              5.258
   93           0.835           1608.975              0.015              6.123              0.344              6.467
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    CAL ID NUMBER:   29   ENGINE TYPE AND MODEL: TFE 731-2             SERIAL NUMBER:   7305-2

TEST ORGANIZATION:  AIRESEARCH

   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO        FUEL     LB CO /    ENERGY    LB CO /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060       168.0     8.177     169.623     1.000       19.00      2.589      53.71     48.205      53.20    0.04867
TAKEOFF     1.000      2800.0     1.617    1387.052     1.000        0.50      0.013      11.56      1.165      23.33    0.00058
CLIMBOUT    0.900      2520.0     2.264    1282.947     1.000        2.50      0.094      53.46      1.765     105.00    0.00090
APPROACH    0.300       840.0     6.904     477.032     1.000        4.50      0.518      35.78     14.473      63.00    0.00822
TAXI-IDLE   0.060       168.0     8.177     169.623     1.000        7.00      0.954      19.79     48.205      19.60    0.04867

                                 TOTAL FOR CYCLE:                          4.169     174.30                264.13
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:          23.918
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:         15.783
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        0.481

   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC        FUEL     LB HC /    ENERGY    LB HC /
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060       168.0     2.600     169.623     1.000       19.00      0.823      53.71     15.328      53.20    0.01548
TAKEOFF     1.000      2800.0     0.059    1387.052     1.000        0.50      0.000      11.56      0.043      23.33    0.00002
CLIMBOUT    0.900      2520.0     0.087    1282.947     1.000        2.50      0.004      53.46      0.068     105.00    0.00003
APPROACH    0.300       840.0     0.947     477.032     1.000        4.50      0.071      35.78      1.986      63.00    0.00113
TAXI-IDLE   0.060       168.0     2.600     169.623     1.000        7.00      0.303      19.79     15.328      19.60    0.01548

                                 TOTAL FOR CYCLE:                          1.202     174.30                264.13
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           6.895
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          4.550
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        0.177

   MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/    ENERGY    LB NOX/
             POWER       # TH       RATE       RATE     WT FACTOR    MODE       MASS       MASS   1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                  MIN.       LBS.       LBS.

TAXI-IDLE   0.060       168.0     0.320     169.623     1.000       19.00      0.101      53.71      1.886      53.20    0.00190
TAKEOFF     1.000      2800.0    19.572    1387.052     1.000        0.50      0.163      11.56     14.111      23.33    0.00699
CLIMBOUT    0.900      2520.0    15.576    1282.947     1.000        2.50      0.649      53.46     12.141     105.00    0.00618
APPROACH    0.300       840.0     2.219     477.032     1.000        4.50      0.166      35.78      4.652      63.00    0.00264
TAXI-IDLE   0.060       168.0     0.320     169.623     1.000        7.00      0.037      19.79      1.886      19.60    0.00190

                                 TOTAL FOR CYCLE:                          1.117     174.30                264.13
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:           6.410
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:          4.230
                                 LBS POLLUTANT/1000K LB TH AT T.O.:       58.250
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DATE:   8/ 3/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA ******************************************************************************************************************

     CAL ID NUMBER:  334    ENGINE TYPE AND MODEL:  SPEY 511-14              SERIAL NUMBER:   7072

                        RATED THRUST:        11400.

     ENGINE TOTAL TIME:                              7500. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                    7500. HRS
          N2 COMPRESSOR OVERHAUL:                    7500. HRS
          COMBUSTOR CAN REPLACEMENT:                   -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                       7500. HRS
          N2 TURBINE OVERHAUL:                       7500. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ******************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   73.00   FINISH   73.00

     ATMOSPHERIC PRESSURE:              START   29.06   FINISH   29.06

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0130

     RELATIVE HUMIDITY:                    71.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  139.00,  FLOW RATE, LITERS/MIN:   16.00

     SAMPLE LINE TRANSPORT TIME, SEC:    0.99

 NUMBER OF TESTS:   6

 COMMENTS:

  H/C CAL ESTIMATED
  SAMPLE LINE TEMP AVERAGED
  PROBE CONFIG. AND LOCATION SAME AS USED FOR SPEY ON 08-02-71


  CLOCK      TEST         POWER              ENGINE           MEASURED   GAS GEN      CALC     COMPRESSOR    ENGINE     TURBINE
  TIME       MODE   THRUST,LBS  PERCENT       SPEED             FUEL    AIR FLOW      F/A     DISCHARGE    PRESSURE     INLET
                        OR       RATED         RPM              FLOW     LB/SEC                  TEMP        RATIO       TEMP
                       SHP       T.O.      N1        N2        LB/HR                          DEGREES F      EPR      DEGREES F

 1000.00     2/ 0   11000.00      96    5420.00  12360.00    7280.00     -0.00   -0.000000      -0.00        2.50        -0.00
 1005.00     3/ 2   10500.00      92    8260.00  12210.00    6860.00     -0.00   -0.000000      -0.00        2.44        -0.00
 1010.00     4/ 3    9980.00      87    8110.00  12070.00    6480.00     -0.00   -0.000000      -0.00        2.34        -0.00
 1015.00     5/ 4    9300.00      81    7940.00  11900.00    6030.00     -0.00   -0.000000      -0.00        2.24        -0.00
 1015.00     6/ 5    7480.00      65    7390.00  11630.00    4710.00     -0.00   -0.000000      -0.00        1.98        -0.00
 1025.00     1/ 6     610.00       5    2670.00   7512.00     900.00     -0.00   -0.000000      -0.00        1.05        -0.00


  POWER    EXHAUST      EXHAUST        CO         CO        THC       NO        NO        NO    ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS         (WET)        2       (WET)     (WET)       2         X
  RATED     TEMP       PRESSURE       PPMV      (WET)      PPMV      PPMV     (WET)     (WET)
  T.O.    DEGREES F      PSIA                 PERCENT V                        PPMV      PPMV

   96      1160.00       35.40        30.70       2.94      4.00    154.70     18.00    172.70     0.54     -0.00      -0.00
   92       117.50       34.41        30.70       2.90      3.40    141.20     14.00    155.20     0.50     -0.00      -0.00
   87      1100.00       33.18        36.20       2.69      3.10    124.70     28.00    152.70     0.53     -0.00      -0.00
   81      1065.00       31.86        37.70       2.53      3.10    118.60     26.00    144.60     0.48     -0.00      -0.00
   65       975.00       28.10        45.00       2.19      3.40     72.00     55.00    127.00     0.48     -0.00      -0.00
    5       830.00       15.10       630.00       2.14    851.00      0.40      6.00      6.40    36.00     -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2        NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   96        2.09      0.16      2.02   3152.17     17.34     19.36     15.25      1.14     14.69   22947.79    126.23    140.92
   92        2.20      0.14      1.65   3152.05     16.62     18.26     15.09      0.96     11.30   21623.05    113.99    125.29
   87        2.70      0.13      3.43   3151.28     15.27     18.70     17.49      0.86     22.22   20420.32     98.96    121.18
   81        2.99      0.14      3.38   3150.81     15.44     18.83     18.02      0.85     20.41   18999.37     93.11    113.52
   65        4.12      0.18      8.27   3148.93     10.82     19.09     19.40      0.84     38.94   14831.45     50.97     89.91
    5       55.30     42.78      0.87   2951.62      0.06      0.92     49.77     38.51      0.78    2656.46      0.05      0.83


  POWER          CO              CO             THC             NO              NO              NO
 PERCENT                          2                                              2               X
  RATED     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR
  T.O.

   96          1.386         2086.162          0.103          11.476           1.335          12.811
   92          1.437         2059.339          0.091          10.856           1.076          11.933
   87          1.752         2046.125          0.086           9.916           2.226          12.142
   81          1.937         2042.943          0.091          10.012           2.195          12.206
   65          2.593         1982.815          0.112           6.815           5.206          12.021
    5         81.595         4354.848         63.124           0.085           1.276           1.362
   CAL ID NUMBER:  334   ENGINE TYPE AND MODEL: SPEY 511-14          SERIAL NUMBER:  7072

TEST ORGANIZATION:  U.S. BUREAU OF MINES

   MODE    FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN      CO        FUEL      LB CO /    ENERGY    LB CO /
             POWER        # TH      RATE       RATE     WT FACTOR     MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE    0.040        456.0    36.765     599.451     1.000       19.00    11.642     189.83     61.331     144.40    0.08062
TAKEOFF      1.000      11400.0    13.374    7753.320     1.000        0.70     0.156      90.46      1.725     133.00    0.00117
CLIMBOUT     0.850       9690.0    16.024    6348.352     1.000        2.20     0.588     232.77      2.524     355.30    0.00165
APPROACH     0.400       4560.0    29.600    3167.199     1.000        4.00     1.973     211.15      9.346     304.00    0.00649
TAXI-IDLE    0.040        456.0    36.765     599.451     1.000        7.00     4.289      69.94     61.331      53.20    0.08062

                                   TOTAL FOR CYCLE:                        18.648     794.14                989.90
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:         23.483
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:        18.839
                                   LBS POLLUTANT/1000K LB TH AT T.O.:       1.369


   MODE    FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN      HC        FUEL      LB HC /    ENERGY    LB HC /
             POWER        # TH      RATE       RATE     WT FACTOR     MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE    0.040        456.0    79.847     599.451     1.000       19.00    25.285     189.83    133.201     144.40    0.17510
TAKEOFF      1.000      11400.0    0.0       7753.320     1.000        0.70    0.0         90.46      0.0       133.00    0.0
CLIMBOUT     0.850       9690.0     0.190    6348.352     1.000        2.20     0.007     232.77      0.030     355.30    0.00002
APPROACH     0.400       4560.0     0.950    3167.199     1.000        4.00     0.063     211.15      0.300     304.00    0.00021
TAXI-IDLE    0.040        456.0    79.847     599.451     1.000        7.00     9.316      69.94    133.201      53.20    0.17510

                                   TOTAL FOR CYCLE:                        34.671     794.14                989.90
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:         43.658
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:        35.025
                                   LBS POLLUTANT/1000K LB TH AT T.O.:       0.0


   MODE    FRACTIONAL     POWER   EMISSION     FUEL       USAGE     TIME IN     NOX        FUEL      LB NOX/    ENERGY    LB NOX/
             POWER        # TH      RATE       RATE     WT FACTOR     MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                   LB/HR      LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE    0.040        456.0     0.639     599.451     1.000       19.00     0.202     189.83      1.067     144.40    0.00140
TAKEOFF      1.000      11400.0   157.299    7753.320     1.000        0.70     1.835      90.46     20.288     133.00    0.01380
CLIMBOUT     0.850       9690.0   121.888    6348.352     1.000        2.20     4.469     232.77     19.200     355.30    0.01258
APPROACH     0.400       4560.0    36.918    3167.199     1.000        4.00     2.461     211.15     11.656     304.00    0.00810
TAXI-IDLE    0.040        456.0     0.639     599.451     1.000        7.00     0.075      69.94      1.067      53.20    0.00140

                                   TOTAL FOR CYCLE:                         9.043     794.14                989.90
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:         11.387
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:         9.135
                                   LBS POLLUTANT/1000K LB TH AT T.O.:     160.979
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DATE:   8/ 3/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA ***************************************************************************************************************

     CAL ID NUMBFR:  335    ENGINE TYPE AND MODEL:  SPEY 511-14              SERIAL NUMBER:   7065

                            RATED THRUST:         11400.

     ENGINE TOTAL TIMF:                                 7861. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    652. HRS

     TIME SINCE:

          N1 COMPRFSSOR OVERHAUL:                      7861. HRS
          N2 COMPRESSOR OVERHAUL:                      7861. HRS
          COMBUSTOR CAN REPLACEMFNT:                     -0. HRS
          FIRST STAGF NOZZLE GUIDF VANE OVERHAUL:       652. HRS
          N1 TURBINF OVERHAUL:                         7861. HRS
          N2 TURBINE OVERHAUL:                         7861. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ******************************************************

     INLET AIR TEMPERATURF, DEGREES F:  START   79.00   FINISH   79.00

     ATMOSPHERIC PRESSURE:              START   29.08   FINISH   29.08

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0130

     RELATIVE HUMIDITY:                     60.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGRFES C:  139.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLF LINE TRANSPORT TIME, SEC:    0.99

NUMBER OF TESTS:   6

COMMENTS:

 H/C CAL ESTIMATFD
 SAMPLE LINE TEMP. AVERAGED
PROBE CONFIG. AND LOCATION SAME AS ON 08-02-71


 CLOCK      TFST           POWER              ENGINE          MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE     TURBINF
 TIME       MODE    THRUST,LBS  PERCENT        SPEED             FUEL     AIR FLOW     F/A      DISCHARGE    PRFSSURE     INLET
                        OR       RATED          RPM              FLOW      LB/SEC                 TEMP         RATIC       TEMP
                       SHP       T.O.      N1         N2        LB/HR                          DEGREES F       EPR      DEGRFFS F

 155.00     2/ 0    11090.00      97    8500.00  12400.00     7370.00     -0.00   -0.000000      -0.00         2.51        -0.00
 200.00     3/ 2    10800.00      94    8390.00  12360.00     7140.00     -0.00   -0.000000      -0.00         2.47        -0.00
 210.00     4/ 3    10120.00      88    8200.00  12200.00     6570.00     -0.00   -0.000000      -0.00         2.36        -0.00
 215.00     5/ 4     9510.00      83    8030.00  12040.00     6120.00     -0.00   -0.000000      -0.00         2.28        -0.00
 220.00     6/ 5     7500.00      65    7420.00  11630.00     4720.00     -0.00   -0.000000      -0.00         1.99        -0.00
 225.00     1/ 6      630.00       5    2700.00   7580.00      930.00     -0.00   -0.000000      -0.00         1.59        -0.00


 POWER     EXHAUST       FXHAUST         CO         CO        THC       NO        NO        NO      ALDFHYDES   SMOKE   PARTICULATES
PERCENT      GAS           GAS          (WET)        2       (WET)     (WET)       2         X
 RATED      TEMP        PRESSURF        PPMV      (WET)      PPMV      PPMV     (WET)     (WET)
 T.O.    DEGRFFS F        PSIA                  PERCENT V                       PPMV      PPMV

  97      1165.00        35.58         34.20      2.93       2.50    154.30      8.50    162.80      0.62      -0.00      -0.00
  94      1140.00        34.98         33.20      3.02       1.30    143.90     11.50    155.40      0.37      -0.00      -0.00
  88      1100.00        33.52         34.20      2.67       2.00    131.70     13.00    144.70      0.40      -0.00      -0.00
  83      1075.00        32.33         35.30      2.57       2.00    122.00     18.50    140.50      0.29      -0.00      -0.00
  65       970.00        28.13         42.50      2.17       2.00     88.50     16.50    105.00      0.34      -0.00      -0.00
   5       520.00        22.72        685.00      1.14     850.00      6.70      3.00      9.70     38.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUFL   LB FUEL   LB FUEL   LB FUFL   LB FUEL

  97        2.34      0.10      0.96   3151.94     17.35     18.31     17.26      0.72      7.04  23229.79    127.89    134.93
  94        2.21      0.05      1.25   3152.29     15.70     16.96     15.75      0.35      8.96  22507.33    112.11    121.07
  88        2.57      0.09      1.60   3151.62     16.25     17.86     16.88      0.57     10.54  20706.13    106.77    117.31
  83        2.75      0.09      2.37   3151.32     15.64     18.01     16.86      0.55     14.51  19286.05     95.71    110.22
  65        3.93      0.11      2.50   3149.43     13.43     15.93     18.53      0.50     11.82  14865.32     63.38     75.19
   5      106.37     75.59      0.77   2791.38      1.71      2.47     98.92     70.30      0.71   2586.68      1.59      2.30


 POWER          CO               CO                THC               NO                NO                NO
PERCENT                           2                                                      2                 X
 RATED     LB/1K#TH-HR      LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

  97          1.556          2094.661            0.065            11.532             0.635            12.167
  94          1.458          2084.012            0.033            10.381             0.830            11.211
  88          1.668          2046.060            0.056            10.551             1.041            11.592
  83          1.773          2027.976            0.058            10.064             1.526            11.590
  65          2.471          1982.042            0.067             8.450             1.576            10.026
   5        157.018          4105.848          111.590             2.523             1.130             3.652
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    CAL ID NUMBER:  335   ENGINE TYPE AND MODEL: SPEY 511-14            SERIAL NUMBER:  7065

TEST ORGANIZATION:  U.S. BUREAU OF MINES


  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      CO        FUEL     LB CO /     ENERGY    LB CO /
            POWER       # TH       RATE      RATE     WT FACTOR     MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR     LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.040       456.0    75.001    686.454     1.000       19.00    23.750     217.38    109.259    144.40    0.16448
TAKEOFF     1.000     11400.0    11.450   7669.500     1.000        0.70     0.134      89.48      1.493    133.00    0.00100
CLIMBOUT    0.850      9690.0    12.568   6402.168     1.000        2.20     0.461     234.75      1.963    355.30    0.00130
APPROACH    0.400      4560.0    51.393   3069.966     1.000        4.00     3.426     204.66     16.741    304.00    0.01127
TAXI-IDLE   0.040       456.0    75.001    686.454     1.000        7.00     8.750      80.09    109.259     53.20    0.16448

                                 TOTAL FOR CYCLE:                           36.521     826.35               989.90
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            44.196
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           36.894
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          1.172


  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN      HC        FUEL     LB HC /     ENERGY    LB HC /
            POWER       # TH       RATE      RATE     WT FACTOR     MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR     LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.040       456.0    52.981    686.454     1.000       19.00    16.777     217.38     77.180    144.40    0.11619
TAKEOFF     1.000     11400.0     0.0     7669.500     1.000        0.70     0.0        89.48      0.0      133.00    0.0
CLIMBOUT    0.850      9690.0     0.0     6402.168     1.000        2.20     0.0       234.75      0.0      355.30    0.0
APPROACH    0.400      4560.0    10.579   3069.966     1.000        4.00     0.705     204.66      3.446    304.00    0.00232
TAXI-IDLE   0.040       456.0    52.981    686.454     1.000        7.00     6.181      80.09     77.180     53.20    0.11619

                                 TOTAL FOR CYCLE:                           23.664     826.35               989.90
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            28.636
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           23.905
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          0.0


  MODE    FRACTIONAL    POWER    EMISSION    FUEL       USAGE     TIME IN     NOX        FUEL     LB NOX/     ENERGY    LB NOX/
            POWER       # TH       RATE      RATE     WT FACTOR     MODE      MASS       MASS    1K LB FUEL  # TH-HR   # TH-HR
                                  LB/HR     LB/HR                   MIN.      LBS.       LBS.

TAXI-IDLE   0.040       456.0     1.386    686.454     1.000       19.00     0.439     217.38      2.019    144.40    0.00304
TAKEOFF     1.000     11400.0   153.961   7669.500     1.000        0.70     1.796      89.48     20.074    133.00    0.01351
CLIMBOUT    0.850      9690.0   110.304   6402.168     1.000        2.20     4.044     234.75     17.229    355.30    0.01138
APPROACH    0.400      4560.0    30.075   3069.966     1.000        4.00     2.005     204.66      9.797    304.00    0.00660
TAXI-IDLE   0.040       456.0     1.386    686.454     1.000        7.00     0.162      80.09      2.019     53.20    0.00304

                                 TOTAL FOR CYCLE:                            8.446     826.35               989.90
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            10.221
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            8.532
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        157.562
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DATE: 8/ 2/71

TEST ORGANIZATION: U.S. BUREAU OF MINES

ENGINE SUPPLIER: AMERICAN AIRLINES

ENGINE DATA **

CAL ID NUMBER: 336 ENGINE TYPE AND MODEL: SPEY 511-14 SERIAL NUMBER: 8091

RATED THRUST: 11400.

ENGINE TOTAL TIME: 2635. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 2130. HRS
N2 COMPRESSOR OVERHAUL: 2130. HRS
COMBUSTOR CAN REPLACEMENT: -0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 0. HRS
N1 TURBINE OVERHAUL: 0. HRS
N2 TURBINE OVERHAUL: 0. HRS

FUEL: JET - A FUEL H/C RATIO: 1.920

OPERATIONAL DATA ***

INLET AIR TEMPERATURE, DEGREES F: START 79.00 FINISH 79.00

ATMOSPHERIC PRESSURE: START 29.08 FINISH 29.08

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0110

RELATIVE HUMIDITY: 53.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 141.00, FLOW RATE, LITERS/MIN: 16.00

SAMPLE LINE TRANSPORT TIME, SEC: 0.99

NUMBER OF TESTS: 8

COMMENTS:

H/C CAL ESTIMATED
SAMPLE LINE TEMP. AVERAGED
NEW PROBE CONFIGURATION

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
230.00	1/ 0	610.00	5	2700.00	7660.00	890.00	-0.00	-0.000000	-0.00	1.06	-0.00
235.00	2/ 1	10920.00	95	8480.00	12400.00	7070.00	-0.00	-0.000000	-0.00	2.49	-0.00
-0.00	2/ 2	11000.00	96	8500.00	12460.00	7100.00	-0.00	-0.000000	-0.00	2.49	-0.00
245.00	3/ 2	10500.00	92	8330.00	12290.00	6700.00	-0.00	-0.000000	-0.00	2.42	-0.00
250.00	4/ 3	9950.00	87	8170.00	12150.00	6200.00	-0.00	-0.000000	-0.00	2.35	-0.00
255.00	5/ 4	9430.00	82	8010.00	12010.00	5860.00	-0.00	-0.000000	-0.00	2.26	-0.00
300.00	6/ 5	7470.00	65	7400.00	11660.00	4510.00	-0.00	-0.000000	-0.00	1.92	-0.00
305.00	1/ 6	630.00	5	2720.00	7710.00	890.00	-0.00	-0.000000	-0.00	1.06	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO 2 (WET) PPMV	NO X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
5	820.00	15.26	645.00	1.35	1037.00	1.10	7.00	8.10	-0.00	-0.00	-0.00
95	1140.00	35.28	30.70	3.25	4.50	172.10	29.00	201.00	0.83	-0.00	-0.00
96	1135.00	35.38	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
92	1100.00	34.38	37.30	3.18	3.50	158.20	40.00	198.20	0.70	-0.00	-0.00
87	1075.00	33.26	33.40	2.98	3.00	144.40	43.00	187.40	0.73	-0.00	-0.00
82	1050.00	32.03	34.30	2.90	2.80	130.70	41.00	171.70	0.68	-0.00	-0.00
65	9.45	27.38	44.00	2.50	2.60	81.90	36.00	127.90	0.53	-0.00	-0.00
5	800.00	15.26	645.00	1.35	734.00	0.0	8.00	8.00	41.50	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
5	85.33	78.57	1.52	2806.25	0.24	1.76	75.95	69.93	1.35	2497.56	0.21	1.57
95	1.90	0.16	2.94	3152.47	17.45	20.38	13.40	1.12	20.79	22288.00	123.38	144.10
96	0.20	0.12	0.33	3155.26	0.33	0.66	1.43	0.82	2.34	22402.34	2.34	4.68
92	2.04	0.13	4.15	3152.34	16.39	20.54	13.65	0.85	27.77	21120.68	109.84	137.62
87	2.28	0.12	4.75	3152.00	15.97	20.72	14.11	0.72	29.48	19542.37	98.99	128.47
82	2.37	0.11	4.66	3151.86	14.85	19.51	13.90	0.65	27.30	18469.88	87.02	114.32
65	3.53	0.12	4.74	3150.02	10.79	16.85	15.91	0.54	21.39	14206.58	48.65	75.98
5	87.07	56.75	1.77	2863.40	0.0	1.77	77.49	50.51	1.58	2548.43	0.0	1.58

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO 2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO 2 LB/1K#TH-HR	NO X LB/1K#TH-HR
5	124.502	4094.367	114.641	0.349	2.219	2.568
95	1.227	2041.025	0.103	11.299	1.904	13.196
96	0.130	2036.577	0.074	0.213	0.213	0.426
92	1.300	2011.493	0.081	10.461	2.645	13.106
87	1.418	1964.058	0.072	9.949	2.963	12.912
82	1.474	1958.630	0.069	9.228	2.895	12.123
65	2.130	1931.818	0.072	6.513	2.863	10.171
5	123.004	4045.120	80.168	0.0	2.506	2.506

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    CAL ID NUMBER:  336   ENGINE TYPE AND MODEL: SPEY 511-14            SERIAL NUMBER:  8091

TEST ORGANIZATION:  U.S. BUREAU OF MINES

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      CO         FUEL     LB CO /     ENERGY   LB CO /
             POWER      # TH       RATE       RATE     WT FACTOR     MODE      MASS        MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.      LBS.        LBS.

TAXI-IDLE   0.040       456.0    51.274     554.190     1.000      19.00    16.237      175.49     92.520    144.40    0.11244
TAKEOFF     1.000     11400.0    18.380    7408.145     1.000       0.70     0.214       86.43      2.481    133.00    0.00161
CLIMBOUT    0.850      9690.0    16.475    6271.344     1.000       2.20     0.604      229.95      2.627    355.30    0.00170
APPROACH    0.400      4560.0    32.205    3091.461     1.000       4.00     2.147      206.10     10.418    304.00    0.00706
TAXI-IDLE   0.040       456.0    51.274     554.190     1.000       7.00     5.982       64.66     92.520     53.20    0.11244

                                 TOTAL FOR CYCLE:                           25.184      762.62               989.90
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            33.023
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           25.441
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          1.881

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN      HC         FUEL     LB HC /     ENERGY   LB HC /
             POWER      # TH       RATE       RATE     WT FACTOR     MODE      MASS        MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.      LBS.        LBS.

TAXI-IDLE   0.040       456.0    67.567     554.190     1.000      19.00    21.396      175.49    121.920    144.40    0.14817
TAKEOFF     1.000     11400.0     0.0      7408.145     1.000       0.70     0.0         86.43      0.0      133.00    0.0
CLIMBOUT    0.850      9690.0     0.244    6271.344     1.000       2.20     0.009      229.95      0.039    355.30    0.00003
APPROACH    0.400      4560.0     1.368    3091.461     1.000       4.00     0.091      206.10      0.442    304.00    0.00030
TAXI-IDLE   0.040       456.0    67.567     554.190     1.000       7.00     7.883       64.66    121.920     53.20    0.14817

                                 TOTAL FOR CYCLE:                           29.379      762.62               989.90
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            38.524
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:           29.679
                                 LBS POLLUTANT/1000K LB TH AT T.O.:          0.0

  MODE    FRACTIONAL    POWER    EMISSION     FUEL       USAGE     TIME IN     NOX         FUEL     LB NOX/     ENERGY   LB NOX/
             POWER      # TH       RATE       RATE     WT FACTOR     MODE      MASS        MASS    1K LB FUEL  # TH-HR  # TH-HR
                                   LB/HR      LB/HR                  MIN.      LBS.        LBS.

TAXI-IDLE   0.040       456.0     0.526     554.190     1.000      19.00     0.167      175.49      0.950    144.40    0.00115
TAKEOFF     1.000     11400.0   161.744    7408.145     1.000       0.70     1.887       86.43     21.833    133.00    0.01419
CLIMBOUT    0.850      9690.0   129.085    6271.344     1.000       2.20     4.733      229.95     20.583    355.30    0.01332
APPROACH    0.400      4560.0    30.586    3091.461     1.000       4.00     2.039      206.10      9.894    304.00    0.00671
TAXI-IDLE   0.040       456.0     0.526     554.190     1.000       7.00     0.06[illegible]       64.66      0.950     53.20    0.00115

                                 TOTAL FOR CYCLE:                            8.887      762.62               989.90
                                 LBS POLLUTANT/1K LB FUEL/CYCLE:            11.654
                                 LBS POLLUTANT/1K LB TH-HR/CYCLE:            8.978
                                 LBS POLLUTANT/1000K LB TH AT T.O.:        165.528
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DATE: 7/30/71

TEST ORGANIZATION: U.S. BUREAU OF MINES

ENGINE SUPPLIER: AMERICAN AIRLINES

ENGINE DATA **

CAL ID NUMBER: 411 ENGINE TYPE AND MODEL: SPEY 511-14 SERIAL NUMBER: 7071

RATED THRUST: 11400.

ENGINE TOTAL TIME: 7237. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	1635. HRS
N2 COMPRESSOR OVERHAUL:	1635. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	0. HRS
N1 TURBINE OVERHAUL:	1635. HRS
N2 TURBINE OVERHAUL:	1635. HRS

FUEL: JET - A FUEL H/C RATIO: 1.920

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 72.00 FINISH 74.00

ATMOSPHERIC PRESSURE: START 14.45 FINISH 14.45

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0067

RELATIVE HUMIDITY: 54.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 137.00, FLOW RATE, LITERS/MIN: 16.00

SAMPLE LINE TRANSPORT TIME, SEC: 0.99

NUMBER OF TESTS: 10

COMMENTS:

SPEY PROBE 4.8" FROM TAILPIPE FOR FIRST THREE RUNS. PROBE FAILED AND A JT3/8 D PROBE USED FOR REMAINING RUNS BUT LOST ON RUN 5. SMALL SAMPLE FLOW TAKEN THRU BROKEN SAMPLE LINE FOR REMAINDER OF RUNS.

CLOCK TIME	TEST MODE	POWER THRUST, LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1130.00	1/ 0	430.00	3	2500.00	7325.00	870.00	-0.00	-0.000000	-0.00	1.06	-0.00
1135.00	1/ 1	550.00	4	2590.00	7480.00	890.00	-0.00	-0.000000	-0.00	1.06	-0.00
1140.00	2/ 1	11350.00	99	8540.00	12280.00	-0.00	-0.00	-0.000000	-0.00	2.54	-0.00
1255.00	1/ 2	580.00	5	2680.00	7630.00	940.00	-0.00	-0.000000	-0.00	-0.00	-0.00
100.00	2/ 1	11360.00	99	8460.00	12350.00	7620.00	-0.00	-0.000000	-0.00	2.56	-0.00
105.00	3/ 2	10820.00	94	8280.00	12200.00	7170.00	-0.00	-0.000000	-0.00	2.48	-0.00
110.00	4/ 3	10350.00	90	8150.00	12090.00	6800.00	-0.00	-0.000000	-0.00	2.40	-0.00
115.00	5/ 4	9830.00	86	8020.00	11980.00	6430.00	-0.00	-0.000000	-0.00	2.33	-0.00
120.00	6/ 5	7500.00	65	7340.00	11614.00	4800.00	-0.00	-0.000000	-0.00	1.99	-0.00
125.00	1/ 6	600.00	5	2710.00	7730.00	920.00	-0.00	-0.000000	-0.00	1.07	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO 2 (WET) PPMV	NO X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
3	820.00	15.28	860.00	1.45	1361.00	0.0	4.00	4.00	-0.00	-0.00	-0.00
4	825.00	15.28	735.00	1.28	950.00	0.0	4.00	4.00	-0.00	-0.00	-0.00
99	1170.00	36.25	45.00	2.72	19.70	141.50	9.00	150.50	-0.00	-0.00	-C.00
5	-0.00	-C.00	710.00	1.43	873.00	5.40	4.50	9.90	-0.00	-0.00	-0.00
99	1170.00	36.45	39.20	2.83	-0.00	141.30	9.00	150.30	1.22	-0.00	-0.00
94	1135.00	35.25	38.20	2.67	-0.00	125.10	10.50	135.60	0.89	-0.00	-C.00
90	1110.00	34.30	35.30	2.59	-0.00	119.20	11.00	130.20	0.75	-0.00	-0.00
86	1090.00	33.25	35.30	2.49	-0.00	112.60	11.50	124.10	0.66	-0.00	-0.00
65	975.00	24.41	36.30	2.41	-0.00	77.40	11.00	88.40	0.36	-0.00	-0.00
5	825.00	15.43	470.00	0.93	659.00	0.0	6.50	6.50	29.30	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
3	103.30	93.63	0.79	2736.70	0.0	0.79	89.98	81.46	0.69	2380.93	0.0	0.69
4	101.92	75.45	0.91	2788.77	0.0	0.91	90.71	67.15	0.81	2482.01	0.0	0.81
99	3.32	0.83	1.09	3148.40	17.12	18.21	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00
5	89.79	63.23	0.93	2841.36	1.12	2.06	84.40	59.43	0.88	2670.87	1.05	1.93
99	2.78	-0.00	1.05	3151.52	16.45	17.50	21.17	-0.00	7.98	24014.61	125.35	133.33
94	2.87	-0.00	1.30	3151.38	15.44	16.73	20.57	-0.00	9.29	22595.40	110.67	119.96
90	2.73	-0.00	1.40	3151.59	15.16	16.56	18.59	-0.00	9.52	21430.83	103.11	112.62
86	2.84	-0.00	1.52	3151.42	14.90	16.47	18.28	-0.00	9.78	20263.63	95.79	105.58
65	3.02	-0.00	1.50	3151.14	10.58	12.08	14.50	-0.00	7.22	15125.48	50.78	58.00
5	90.52	72.69	2.06	2814.25	0.0	2.06	83.28	66.87	1.89	2589.11	0.0	1.89

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO 2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO 2 LB/1K#TH-HR	NO X LB/1K#TH-HR
3	209.012	5537.047	189.442	0.0	1.597	1.597
4	164.922	4512.742	122.085	0.0	1.474	1.474
99	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
5	145.516	4604.957	102.473	1.818	1.515	3.333
99	1.864	2113.963	-0.000	11.034	0.703	11.737
94	1.902	2088.299	-0.000	10.229	0.859	11.087
90	1.796	2070.612	-0.000	9.962	0.919	10.882
86	1.860	2061.407	-0.000	9.745	0.995	10.740
65	1.933	2016.731	-0.000	6.771	0.962	7.733
5	138.796	4315.180	111.457	0.0	3.153	3.153

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     CAL ID NUMBER:  411   ENGINE TYPE AND MODEL: SPEY 511-14          SERIAL NUMBER:  7071

TEST ORGANIZATION:  U.S. BUREAU OF MINES

    MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN      CO         FUEL      LB CO /     ENERGY    LB CO /
              POWER        # TH       RATE       RATE      WT FACTOR     MODE      MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                     LB/HR      LB/HR                    MIN.      LBS.        LBS.

TAXI-IDLE    0.040         456.0    77.652     806.071      1.000       19.00    24.590      255.26     96.334     144.40     0.17029
TAKEOFF      1.000       11400.0    13.666    7669.965      1.000        0.70     0.159       89.48      1.782     133.00     0.00120
CLIMBOUT     0.850        9690.0    15.938    6397.875      1.000        2.20     0.584      234.59      2.491     355.30     0.00164
APPROACH     0.400        4560.0    43.075    2878.047      1.000        4.00     2.872      191.87     14.967     304.00     0.00945
TAXI-IDLE    0.040         456.0    77.652     806.071      1.000        7.00     9.059       94.04     96.334      53.20     0.17029

                                   TOTAL FOR CYCLE:                              37.265      865.24                989.90
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:               43.069
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:              37.645
                                   LBS POLLUTANT/1000K LB TH AT T.O.:             1.399


    MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN      HC         FUEL      LB HC /     ENERGY    LB HC /
              POWER        # TH       RATE       RATE      WT FACTOR     MODE      MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                     LB/HR      LB/HR                    MIN.      LBS.        LBS.

TAXI-IDLE    0.040         456.0    63.808     806.071      1.000       19.00    20.206      255.26     79.159     144.40     0.13993
TAKEOFF      1.000       11400.0     0.0      7669.965      1.000        0.70     0.0         89.48      0.0       133.00     0.0
CLIMBOUT     0.850        9690.0     0.535    6397.875      1.000        2.20     0.020      234.59      0.084     355.30     0.00006
APPROACH     0.400        4560.0     3.997    2878.047      1.000        4.00     0.266      191.87      1.389     304.00     0.00088
TAXI-IDLE    0.040         456.0    63.808     806.071      1.000        7.00     7.444       94.04     79.159      53.20     0.13993

                                   TOTAL FOR CYCLE:                              27.936      865.24                989.90
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:               32.287
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:              28.221
                                   LBS POLLUTANT/1000K LB TH AT T.O.:             0.0


    MODE    FRACTIONAL     POWER    EMISSION     FUEL        USAGE     TIME IN     NOX         FUEL      LB NOX/     ENERGY    LB NOX/
              POWER        # TH       RATE       RATE      WT FACTOR     MODE      MASS        MASS    1K LB FUEL  # TH-HR   # TH-HR
                                     LB/HR      LB/HR                    MIN.      LBS.        LBS.

TAXI-IDLE    0.040         456.0     0.844     806.071      1.000       19.00     0.267      255.26      1.047     144.40     0.00185
TAKEOFF      1.000       11400.0   139.044    7669.965      1.000        0.70     1.622       89.48     18.128     133.00     0.01220
CLIMBOUT     0.850        9690.0    97.758    6397.875      1.000        2.20     3.584      234.59     15.280     355.30     0.01009
APPROACH     0.400        4560.0    24.203    2878.047      1.000        4.00     1.614      191.87      8.410     304.00     0.00531
TAXI-IDLE    0.040         456.0     0.844     806.071      1.000        7.00     0.099       94.04      1.047      53.20     0.00185

                                   TOTAL FOR CYCLE:                               7.186      865.24                989.90
                                   LBS POLLUTANT/1K LB FUEL/CYCLE:                8.305
                                   LBS POLLUTANT/1K LB TH-HR/CYCLE:               7.259
                                   LBS POLLUTANT/1000K LB TH AT T.O.:           142.296
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MODEL  T56-A7 TURBOPROP       SAMPLE NUMBER =  11.

MODE                EMISSION      FUEL       TIME IN       CO          FUEL        LB CO /      ENERGY      LB CO /
                      RATE        RATE        MODE        MASS         MASS      1K LB FUEL     HP-HR        HP-HR
                      LB/HR       LB/HR       MIN.        LBS.         LBS.

TAXI-IDLE   MEAN     15.268      548.004     19.00       4.835       173.53        28.101       35.67      0.13553
            STD DEV   3.519       54.095      0.0        1.115        17.13         6.597        0.04      0.03124

TAKEOFF     MEAN      2.150     2079.317      0.50       0.018        17.33         1.040       31.29      0.00057
            STD DEV   1.285       77.480      0.0        0.011         0.65         0.627        0.03      0.00034

CLIMBOUT    MEAN      3.009     1908.447      2.50       0.125        79.52         1.579      140.81      0.00089
            STD DEV   0.791       25.675      0.0        0.033         1.08         0.421        0.18      0.00023

APPROACH    MEAN      3.668     1052.900      4.50       0.275        78.97         3.482       84.49      0.00326
            STD DEV   0.841       23.937      0.0        0.063         1.79         0.787        0.14      0.00075

TAXI-IDLE   MEAN     15.268      548.004      7.00       1.781        63.93        28.101       13.14      0.13553
            STD DEV   3.519       54.095      0.0        0.411         6.31         6.597        0.01      0.03124

            TOTAL FOR CYCLE                    MEAN:     7.035       413.28                    305.41
                                           STD DEV:      1.502        24.11                      0.0

            LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:    17.064
                                           STD DEV:      3.570

            LBS POLLUTANT/1K HP-HR/CYCLE       MEAN:    23.033
                                           STD DEV:      4.917

            LBS POLLUTANT/1000K HP-HR AT T.O.  MEAN:     0.477
                                           STD DEV:      0.285

MODE                EMISSION      FUEL       TIME IN       HC          FUEL        LB HC /      ENERGY      LB HC /
                      RATE        RATE        MODE        MASS         MASS      1K LB FUEL     HP-HR        HP-HR
                      LB/HR       LB/HR       MIN.        LBS.         LBS.

TAXI-IDLE   MEAN      6.474      548.004     19.00       2.050       173.53        11.923       35.67      0.05747
            STD DEV   1.612       54.095      0.0        0.511        17.13         3.054        0.04      0.01431

TAKEOFF     MEAN      0.430     2079.317      0.50       0.004        17.33         0.207       31.29      0.00011
            STD DEV   0.911       77.480      0.0        0.008         0.65         0.438        0.03      0.00024

CLIMBOUT    MEAN      0.476     1908.447      2.50       0.020        79.52         0.250      140.81      0.00014
            STD DEV   0.976       25.675      0.0        0.041         1.08         0.512        0.18      0.00029

APPROACH    MEAN      0.517     1052.900      4.50       0.039        78.97         0.491       84.49      0.00046
            STD DEV   1.004       23.937      0.0        0.075         1.79         0.952        0.14      0.00089

TAXI-IDLE   MEAN      6.474      548.004      7.00       0.755        63.93        11.923       13.14      0.05747
            STD DEV   1.612       54.095      0.0        0.188         6.31         3.054        0.01      0.01431

            TOTAL FOR CYCLE                    MEAN:     2.868       413.28                    305.41
                                           STD DEV:      0.705        24.11                      0.0

            LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:     6.970
                                           STD DEV:      1.745

            LBS POLLUTANT/1K HP-HR/CYCLE       MEAN:     9.390
                                           STD DEV:      2.309

            LBS POLLUTANT/1000K HP-HR AT T.O.  MEAN:     0.955
                                           STD DEV:      2.021

MODE                EMISSION      FUEL       TIME IN      NOX          FUEL        LB NOX/      ENERGY      LB NOX/
                      RATE        RATE        MODE        MASS         MASS      1K LB FUEL     HP-HR        HP-HR
                      LB/HR       LB/HR       MIN.        LBS.         LBS.

TAXI-IDLE   MEAN      2.161      548.004     19.00       0.684       173.53         3.932       35.67      0.01918
            STD DEV   0.499       54.095      0.0        0.158        17.13         0.743        0.04      0.00443

TAKEOFF     MEAN     22.878     2079.317      0.50       0.191        17.33        10.984       31.29      0.00609
            STD DEV   3.566       77.480      0.0        0.030         0.65         1.501        0.03      0.00095

CLIMBOUT    MEAN     21.212     1908.447      2.50       0.884        79.52        11.111      140.81      0.00628
            STD DEV   2.314       25.675      0.0        0.096         1.08         1.154        0.18      0.00068

APPROACH    MEAN      7.776     1052.900      4.50       0.583        78.97         7.382       84.49      0.00690
            STD DEV   0.913       23.937      0.0        0.068         1.79         0.812        0.14      0.00081

TAXI-IDLE   MEAN      2.161      548.004      7.00       0.252        63.93         3.932       13.14      0.01918
            STD DEV   0.499       54.095      0.0        0.058         6.31         0.743        0.01      0.00443

            TOTAL FOR CYCLE                    MEAN:     2.594       413.28                    305.41
                                           STD DEV:      0.378        24.11                      0.0

            LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:     6.269
                                           STD DEV:      0.761

            LBS POLLUTANT/1K HP-HR/CYCLE       MEAN:     8.494
                                           STD DEV:      1.237

            LBS POLLUTANT/1000K HP-HR AT T.O.  MEAN:    50.773
                                           STD DEV:      7.914
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MODEL  T56-A15 TURBOPROP     SAMPLE NUMBER =  12.


 MODE                 EMISSION      FUEL      TIME IN       CO          FUEL       LB CO /     ENERGY       LB CO /
                        RATE        RATE       MODE        MASS         MASS     1K LB FUEL     HP-HR        HP-HR
                        LB/HR       LB/HR      MIN.        LBS.         LBS.

TAXI-IDLE  MEAN         8.735     493.001      19.00       2.766       156.12       18.050       43.61      0.06342
           STD DEV      7.491     122.165      0.0         2.372        38.68       13.473        0.09      0.05439

TAKEOFF    MEAN         3.765    2392.661       0.50       0.031        19.94        1.565       38.26      0.00082
           STD DEV      1.293     124.766      0.0         0.011         1.04        0.491        0.05      0.00028

CLIMBOUT   MEAN         3.404    2188.467       2.50       0.142        91.19        1.549      172.16      0.00082
           STD DEV      0.801      95.255      0.0         0.033         3.97        0.317        0.08      0.00019

APPROACH   MEAN         3.489    1145.895       4.50       0.262        85.94        3.044      103.30      0.00253
           STD DEV      0.848      19.792      0.0         0.064         1.48        0.731        0.15      0.00062

TAXI-IDLE  MEAN         8.735     493.001       7.00       1.019        57.52       18.050       16.07      0.06342
           STD DEV      7.491     122.165      0.0         0.874        14.25       13.473       0.0        0.05439

          TOTAL FOR CYCLE                      MEAN:       4.220       410.70                   373.40
                                           STD DEV:        3.248        54.63                     0.52

          LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:      10.211
                                           STD DEV:        7.267

          LBS POLLUTANT/1K HP-HR/CYCLE         MEAN:      11.302
                                           STD DEV:        8.698

          LBS POLLUTANT/1000K HP-HR AT T.O.    MEAN:       0.683
                                           STD DEV:        0.235


 MODE                 EMISSION      FUEL      TIME IN       HC          FUEL       LB HC /     ENERGY       LB HC /
                        RATE        RATE       MODE        MASS         MASS     1K LB FUEL     HP-HR        HP-HR
                        LB/HR       LB/HR      MIN.        LBS.         LBS.

TAXI-IDLE  MEAN         7.388     493.001      19.00       2.339       156.12       15.046       43.61      0.05364
           STD DEV      5.338     122.165      0.0         1.690        38.68        9.232        0.09      0.03876

TAKEOFF    MEAN         0.440    2392.661       0.50       0.004        19.94        0.179       38.26      0.00010
           STD DEV      0.666     124.766      0.0         0.006         1.04        0.272        0.05      0.00015

CLIMBOUT   MEAN         0.399    2188.467       2.50       0.017        91.19        0.179      172.16      0.00010
           STD DEV      0.590      95.255      0.0         0.025         3.97        0.267        0.08      0.00014

APPROACH   MEAN         0.326    1145.895       4.50       0.024        85.94        0.286      103.30      0.00024
           STD DEV      0.321      19.792      0.0         0.024         1.48        0.281        0.15      0.00023

TAXI-IDLE  MEAN         7.388     493.001       7.00       0.862        57.52       15.046       16.07      0.05364
           STD DEV      5.338     122.165      0.0         0.623        14.25        9.232       0.0        0.03876

          TOTAL FOR CYCLE                      MEAN:       3.246       410.70                   373.40
                                           STD DEV:        2.305        54.63                     0.52

          LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:       7.798
                                           STD DEV:        5.097

          LBS POLLUTANT/1K HP-HR/CYCLE         MEAN:       8.693
                                           STD DEV:        6.174

          LBS POLLUTANT/1000K HP-HR AT T.O.    MEAN:       0.798
                                           STD DEV:        1.210


 MODE                 EMISSION      FUEL      TIME IN      NOX          FUEL       LB NOX/     ENERGY       LB NOX/
                        RATE        RATE       MODE        MASS         MASS     1K LB FUEL     HP-HR        HP-HR
                        LB/HR       LB/HR      MIN.        LBS.         LBS.

TAXI-IDLE  MEAN         1.233     493.001      19.00       0.390       156.12        2.446       43.61      0.00895
           STD DEV      0.697     122.165      0.0         0.221        38.68        1.181        0.09      0.00506

TAKEOFF    MEAN        27.898    2392.661       0.50       0.232        19.94       11.655       38.26      0.00608
           STD DEV     11.532     124.766      0.0         0.096         1.04        4.769        0.05      0.00251

CLIMBOUT   MEAN        22.201    2188.467       2.50       0.925        91.19       10.141      172.16      0.00537
           STD DEV      3.532      95.255      0.0         0.147         3.97        1.550        0.08      0.00085

APPROACH   MEAN         7.323    1145.895       4.50       0.549        85.94        6.384      103.30      0.00532
           STD DEV      1.570      19.792      0.0         0.118         1.48        1.324        0.15      0.00114

TAXI-IDLE  MEAN         1.233     493.001       7.00       0.144        57.52        2.446       16.07      0.00895
           STD DEV      0.697     122.165      0.0         0.081        14.25        1.181       0.0        0.00506

          TOTAL FOR CYCLE                      MEAN:       2.241       410.70                   373.40
                                           STD DEV:        0.546        54.63                     0.52

          LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:       5.431
                                           STD DEV:        0.998

          LBS POLLUTANT/1K HP-HR/CYCLE         MEAN:       6.002
                                           STD DEV:        1.461

          LBS POLLUTANT/1000K HP-HR AT T.O.    MEAN:      50.639
                                           STD DEV:       20.932
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MODEL  TPE-331 TURBOPROP      SAMPLE NUMBER =   3.

 MODE                  EMISSION     FUEL        TIME IN       CO          FUEL        LB CO /     ENERGY       LB CO /
                         RATE       RATE         MODE        MASS         MASS       1K LB FUEL    HP-HR        HP-HR
                        LB/HR       LB/HR        MIN.        LBS.         LBS.

TAXI-IDLE   MEAN        3.533      145.910      19.00       1.119        46.20        24.351       11.11       0.10086
            STD DEV     0.640       16.530       0.0        0.203         5.23         4.413        0.16       0.01989

TAKEOFF     MEAN        0.393      365.419       0.50       0.003         3.05         1.082        4.87       0.00067
            STD DEV     0.309        9.366       0.0        0.003         0.08         0.848        0.07       0.00052

CLIMBOUT    MEAN        0.568      339.093       2.50       0.024        14.13         1.684       21.94       0.00107
            STD DEV     0.313       10.361       0.0        0.013         0.43         0.936        0.32       0.00058

APPROACH    MEAN        2.582      206.096       4.50       0.194        15.46        12.537       13.16       0.01469
            STD DEV     0.443        7.348       0.0        0.033         0.55         2.145        0.19       0.00235

TAXI-IDLE   MEAN        3.533      145.910       7.00       0.412        17.02        24.351        4.09       0.10086
            STD DEV     0.640       16.530       0.0        0.075         1.93         4.413        0.06       0.01989

           TOTAL FOR CYCLE                      MEAN:      1.752        95.86                     55.18
                                            STD DEV:      0.235         8.08                      0.82

           LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:     18.310
                                            STD DEV:      2.290

           LBS POLLUTANT/1K HP-HR/CYCLE         MEAN:     31.788
                                            STD DEV:      4.764

           LBS POLLUTANT/1000K HP-HR AT T.O.    MEAN:      0.556
                                            STD DEV:      0.435

 MODE                  EMISSION     FUEL        TIME IN       HC          FUEL        LB HC /     ENERGY       LB HC /
                         RATE       RATE         MODE        MASS         MASS       1K LB FUEL    HP-HR        HP-HR
                        LB/HR       LB/HR        MIN.        LBS.         LBS.

TAXI-IDLE   MEAN        0.879      145.910      19.00       0.278        46.20         6.091       11.11       0.02520
            STD DEV     0.579       16.530       0.0        0.183         5.23         3.835        0.16       0.01695

TAKEOFF     MEAN        0.055      365.419       0.50       0.000         3.05         0.153        4.87       0.00009
            STD DEV     0.062        9.366       0.0        0.001         0.08         0.175        0.07       0.00011

CLIMBOUT    MEAN        0.053      339.093       2.50       0.002        14.13         0.158       21.94       0.00010
            STD DEV     0.060       10.361       0.0        0.003         0.43         0.184        0.32       0.00011

APPROACH    MEAN        0.240      206.096       4.50       0.018        15.46         1.177       13.16       0.00136
            STD DEV     0.125        7.348       0.0        0.009         0.55         0.643        0.19       0.00070

TAXI-IDLE   MEAN        0.879      145.910       7.00       0.103        17.02         6.091        4.09       0.02520
            STD DEV     0.579       16.530       0.0        0.067         1.93         3.835        0.06       0.01695

           TOTAL FOR CYCLE                      MEAN:      0.402        95.86                     55.18
                                            STD DEV:      0.244         8.08                      0.82

           LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:      4.215
                                            STD DEV:      2.474

           LBS POLLUTANT/1K HP-HR/CYCLE         MEAN:      7.319
                                            STD DEV:      4.557

           LBS POLLUTANT/1000K HP-HR AT T.O.    MEAN:      0.783
                                            STD DEV:      0.877

 MODE                  EMISSION     FUEL        TIME IN      NOX          FUEL        LB NOX/     ENERGY       LB NOX/
                         RATE       RATE         MODE        MASS         MASS       1K LB FUEL    HP-HR        HP-HR
                        LB/HR       LB/HR        MIN.        LBS.         LBS.

TAXI-IDLE   MEAN        0.955      145.910      19.00       0.302        46.20         6.417       11.11       0.02719
            STD DEV     0.360       16.530       0.0        0.114         5.23         1.795        0.16       0.01016

TAKEOFF     MEAN        3.639      365.419       0.50       0.030         3.05         9.902        4.87       0.00624
            STD DEV     1.276        9.366       0.0        0.011         0.08         3.263        0.07       0.00226

CLIMBOUT    MEAN        3.313      339.093       2.50       0.138        14.13         9.706       21.94       0.00631
            STD DEV     1.191       10.361       0.0        0.050         0.43         3.245        0.32       0.00234

APPROACH    MEAN        1.685      206.096       4.50       0.126        15.46         8.113       13.16       0.00962
            STD DEV     0.593        7.348       0.0        0.044         0.55         2.641        0.19       0.00347

TAXI-IDLE   MEAN        0.955      145.910       7.00       0.111        17.02         6.417        4.09       0.02719
            STD DEV     0.360       16.530       0.0        0.042         1.93         1.795        0.06       0.01016

           TOTAL FOR CYCLE                      MEAN:      0.708        95.86                     55.18
                                            STD DEV:      0.239         8.08                      0.82

           LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:      7.280
                                            STD DEV:      1.956

           LBS POLLUTANT/1K HP-HR/CYCLE         MEAN:     12.850
                                            STD DEV:      4.358

           LBS POLLUTANT/1000K HP-HR AT T.O.    MEAN:     51.975
                                            STD DEV:     18.794
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MODEL  CJ805                  SAMPLE NUMBER =   8.

MODE                 EMISSION    FUEL       TIME IN     CO        FUEL       LB CO /      ENERGY      LB CO /
                       RATE      RATE        MODE      MASS       MASS     1K LB FUEL    # TH-HR     # TH-HR
                      LB/HR      LB/HR       MIN.      LBS.       LBS.

TAXI-IDLE  MEAN      63.767    1000.692     19.00     20.193     316.89      63.286       141.87     0.14234
           STD DEV   13.744     128.982     0.0        4.352      40.84       7.654         0.19     0.03068

TAKEOFF    MEAN      29.071    9959.773      0.70      0.339     116.20       2.921       130.67     0.00260
           STD DEV    4.213     251.241     0.0        0.049       2.93       0.437         0.13     0.00038

CLIMBOUT   MEAN      28.876    8290.375      2.20      1.059     303.98       3.488       349.07     0.00303
           STD DEV    4.592     181.826     0.0        0.168       6.67       0.584         0.0      0.00048

APPROACH   MFAN      42.825    3776.597      4.00      2.855     251.77      11.509       298.67     0.00956
           STD DEV   14.524     314.310     0.0        0.968      20.95       4.613         0.0      0.00324

TAXI-IDLE  MEAN      63.767    1000.692      7.00      7.440     116.75      63.286        52.27     0.14234
           STD DEV   13.744     128.982     0.0        1.603      15.05       7.654         0.06     0.03068

         TOTAL FOR CYCLE                    MEAN:    31.885    1105.58                   972.53
                                        STD DEV:      6.547      62.21                     1.20

         LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:    28.662
                                        STD DEV:      4.585

         LBS POLLUTANT/1K LB TH-HR/CYCLE    MEAN:    32.786
                                        STD DEV:      6.732

         LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:    3.028
                                        STD DEV:      0.439


MODE                 EMISSION    FUEL       TIME IN     HC        FUEL       LB HC /      ENERGY      LB HC /
                       RATE      RATE        MODE      MASS       MASS     1K LB FUEL    # TH-HR     # TH-HR
                      LB/HR      LB/HR       MIN.      LBS.       LBS.

TAXI-IDLE  MEAN      27.309    1000.692     19.00      8.648     316.89      27.147       141.87     0.06096
           STD DEV    7.638     128.982     0.0        2.419      40.84       5.843         0.19     0.01705

TAKEOFF    MEAN       0.556    9959.773      0.70      0.006     116.20       0.056       130.67     0.00005
           STD DEV    0.547     251.241     0.0        0.006       2.93       0.054         0.13     0.00005

CLIMBOUT   MEAN       0.583    8290.375      2.20      0.021     303.98       0.070       349.07     0.00006
           STD DEV    0.442     181.826     0.0        0.016       6.67       0.053         0.0      0.00005

APPROACH   MEAN       2.427    3776.597      4.00      0.162     251.77       0.645       298.67     0.00054
           STD DEV    1.882     314.310     0.0        0.125      20.95       0.493         0.0      0.00042

TAXI-IDLE  MFAN      27.309    1000.692      7.00      3.186     116.75      27.147        52.27     0.06096
           STD DEV    7.638     128.982     0.0        0.891      15.05       5.843         0.06     0.01705

         TOTAL FOR CYCLE                    MEAN:    12.024    1105.58                   972.53
                                        STD DEV:      3.297      62.21                     1.20

         LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:    10.849
                                        STD DEV:      2.798

         LBS POLLUTANT/1K LB TH-HR/CYCLF    MEAN:    12.363
                                        STD DEV:      3.390

         LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:    0.579
                                        STD DEV:      0.570


MODE                 EMISSION    FUEL       TIME IN     NOX       FUEL       LB NOX/      ENFRGY      LB NOX/
                       RATE      RATE        MODE      MASS       MASS     1K LB FUEL    # TH-HR     # TH-HR
                      LB/HR      LB/HR       MIN.      LBS.       LBS.

TAXI-IDLE  MEAN       1.566    1000.692     19.00      0.496     316.89       1.547       141.87     0.00350
           STD DEV    0.450     128.982     0.0        0.143      40.84       0.323         0.19     0.00101

TAKEOFF    MEAN     110.632    9959.773      0.70      1.291     116.20      11.086       130.67     0.00988
           STD DEV   17.743     251.241     0.0        0.207       2.93       1.565         0.13     0.00158

CLIMBOUT   HFAN      73.982    8290.375      2.20      2.713     303.98       8.917       349.07     0.00777
           STD DEV    6.116     181.826     0.0        0.224       6.67       0.600         0.0      0.00064

APPROACH   MEAN      17.845    3776.597      4.00      1.190     251.77       4.739       298.67     0.00398
           STD DEV    1.362     314.310     0.0        0.091      20.95       0.336         0.0      0.00030

TAXI-IDLF  MFAN       1.566    1000.692      7.00      0.183     116.75       1.547        52.27     0.00350
           STD DEV    0.450     128.982     0.0        0.053      15.05       0.323         0.06     0.00101

         TOTAL FOR CYCLE                    MEAN:     5.872    1105.58                   972.53
                                        STD DEV:      0.466      62.21                     1.20

         LBS POLLUTANT/1K LB FUFL/CYCLE     MEAN:     5.315
                                        STD DEV:      0.376

         LBS POLLUTANT/1K LB TH-HR/CYCLE    MEAN:     6.037
                                        STD DEV:      0.479

         LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN: 115.242
                                        STD DEV:     18.482
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MODEL  JT3C                    SAMPLE NUMBER =   7.

MODE                 EMISSION     FUEL       TIME IN      CO        FUEL       LB CO /      ENERGY       LB CO /
                       RATE       RATE        MODE       MASS       MASS     1K LB FUEL    # TH-HR      # TH-HR
                       LB/HR      LB/HR       MIN.       LBS.       LBS.

TAXI-IDLE   MEAN      92.626    1197.786     19.00      29.332     379.30      77.296       187.74      0.15618
            STD DEV   38.370      89.053     0.0        12.151      28.20      30.070         5.99      0.06362

TAKEOFF     MEAN       9.036   10183.211      0.70       0.105     118.80       0.879       138.33      0.00076
            STD DEV    7.896     413.273     0.0         0.092       4.82       0.756         4.41      0.00066

CLIMBOUT    MEAN      15.957    8509.188      2.20       0.585     312.00       1.873       369.55      0.00158
            STD DEV    8.429     342.477     0.0         0.309      12.56       0.972        11.78      0.00082

APPROACH    MEAN      49.015    4115.418      4.00       3.268     274.36      12.199       316.19      0.01030
            STD DEV   23.793     245.341     0.0         1.586      16.36       6.355        10.08      0.00489

TAXI-IDLE   MEAN      92.626    1197.786      7.00      10.806     139.74      77.296        69.17      0.15618
            STD DEV   38.370      89.053     0.0         4.477      10.39      30.070         2.21      0.06362

         TOTAL FOR CYCLE                       MEAN:  44.096    1224.21                   1080.97
                                           STD DEV:  18.172      44.98                     34.50

         LBS POLLUTANT/1K LB FUEL/CYCLE        MEAN:  36.092
                                           STD DEV:  14.530

         LBS POLLUTANT/1K LB TH-HR/CYCLE       MEAN:  40.766
                                           STD DEV:  16.495

         LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:   0.882
                                           STD DEV:   0.764


MODE                 EMISSION     FUEL       TIME IN      HC        FUEL       LB HC /      ENERGY       LB HC /
                       RATE       RATE        MODE       MASS       MASS     1K LB FUEL    # TH-HR      # TH-HR
                       LB/HR      LB/HR       MIN.       LBS.       LBS.

TAXI-IDLE   MEAN      92.190    1197.786     19.00      29.193     379.30      78.505       187.74      0.15729
            STD DEV   54.930      89.053     0.0        17.394      28.20      47.516         5.99      0.09770

TAKEOFF     MEAN       0.855   10183.211      0.70       0.010     118.80       0.086       138.33      0.00007
            STD DEV    1.346     413.273     0.0         0.016       4.82       0.135         4.41      0.00012

CLIMBOUT    MEAN       0.893    8509.188      2.20       0.033     312.00       0.106       369.55      0.00009
            STD DEV    0.598     342.477     0.0         0.022      12.56       0.071        11.78      0.00006

APPROACH    MEAN       8.261    4115.418      4.00       0.551     274.36       2.018       316.19      0.00173
            STD DEV    6.637     245.341     0.0         0.446      16.36       1.626        10.08      0.00139

TAXI-IDLE   MEAN      92.190    1197.786      7.00      10.755     139.74      78.505        69.17      0.15729
            STD DEV   54.930      89.053     0.0         6.408      10.39      47.516         2.21      0.09770

         TOTAL FOR CYCLE                       MEAN:  40.542    1224.21                   1080.97
                                           STD DEV:  23.891      44.98                     34.50

         LBS POLLUTANT/1K LB FUEL/CYCLE        MEAN:  33.500
                                           STD DEV:  20.138

         LBS POLLUTANT/1K LB TH-HR/CYCLE       MEAN:  37.926
                                           STD DEV:  23.285

         LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:   0.864
                                           STD DEV:   1.362


MODE                 EMISSION     FUEL       TIME IN      NOX       FUEL       LB NOX/      ENERGY       LB NOX/
                       RATE       RATE        MODE       MASS       MASS     1K LB FUEL    # TH-HR      # TH-HR
                       LB/HR      LB/HR       MIN.       LBS.       LBS.

TAXI-IDLE   MEAN       2.489    1197.786     19.00       0.788     379.30       2.065       187.74      0.00419
            STD DEV    0.787      89.053     0.0         0.249      28.20       0.578         5.99      0.00127

TAKEOFF     MEAN     119.008   10183.211      0.70       1.388     118.80      11.637       138.33      0.01000
            STD DEV   25.788     413.273     0.0         0.301       4.82       2.240         4.41      0.00201

CLIMBOUT    MEAN      84.675    8509.188      2.20       3.105     312.00       9.929       369.55      0.00839
            STD DEV   13.642     342.477     0.0         0.500      12.56       1.398        11.78      0.00122

APPROACH    MEAN      23.212    4115.418      4.00       1.547     274.36       5.654       316.19      0.03490
            STD DEV    2.698     245.341     0.0         0.180      16.36       0.734        10.08      0.00061

TAXI-IDLE   MEAN       2.489    1197.786      7.00       0.290     139.74       2.065        69.17      0.00419
            STD DEV    0.787      89.053     0.0         0.092      10.39       0.578         2.21      0.00127

         TOTAL FOR CYCLE                       MEAN:   7.119    1224.21                   1080.97
                                           STD DEV:   0.998      44.98                     34.50

         LBS POLLUTANT/1K LB FUEL/CYCLE        MEAN:   5.820
                                           STD DEV:   0.837

         LBS POLLUTANT/1K LB TH-HR/CYCLE       MEAN:   6.576
                                           STD DEV:   0.816

         LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN: 116.722
                                           STD DEV:  23.396
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MODEL  JT3D                    SAMPLE NUMBER =  26.


MODE                  EMISSION     FUEL       TIME IN      CO          FUEL       LB CO /       ENERGY      LB CO /
                        RATE       RATE        MODE       MASS         MASS      1K LB FUEL    # TH-HR     # YH-HR
                       LB/HR      LB/HR        MIN.       LBS.         LBS.

TAXI-IDLE  MEAN      109.109     871.960      19.00      34.551       276.12      124.010      292.91     0.11864
           STD DEV    59.629     196.805       0.0       18.883        62.32       58.770       18.07     0.06647

TAKEOFF    MEAN       12.269   10835.289       0.70       0.143       126.41        1.137      215.83     0.00066
           STD DEV     8.507     821.060       0.0        0.099         9.58        0.781       13.32     0.00045

CLIMBOUT   MEAN       15.303    8955.805       2.20       0.561       328.38        1.735      576.58     0.00098
           STD DEV     7.927     662.439       0.0        0.291        24.29        0.940       35.57     0.00052

APPROACH   MEAN       39.678    4137.551       4.00       2.645       275.84        9.634      493.33     0.00539
           STD DEV    19.986     350.089       0.0        1.332        23.34        4.850       30.43     0.00280

TAXI-IDLE  MEAN      109.109     871.960       7.00      12.729       101.73      124.010      107.92     0.11864
           STD DEV    59.629     196.805       0.0        6.957        22.96       58.770        6.65     0.06647

          TOTAL FOR CYCLE                      MEAN:     50.630      1108.48                  1686.58
                                           STD DEV:      25.900       114.52                   103.94

          LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:     45.194
                                           STD DEV:      22.182

          LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:     30.191
                                           STD DEV:      15.854

          LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:     0.768
                                           STD DEV:       0.522


MODE                  EMISSION     FUEL       TIME IN      HC          FUEL       LB HC /       ENERGY      LB HC /
                        RATE       RATE        MODE       MASS         MASS      1K LB FUEL    # TH-HR     # TH-HR
                       LB/HR      LB/HR        MIN.       LBS.         LBS.

TAXI-IDLE  MEAN       98.643     871.960      19.00      31.237       276.12      115.413      292.91     0.10699
           STD DEV    58.151     196.805       0.0       18.414        62.32       70.759       18.07     0.06461

TAKEOFF    MEAN        4.654   10835.289       0.70       0.054       126.41        0.416      215.83     0.00025
           STD DEV     8.731     821.060       0.0        0.102         9.58        0.783       13.32     0.00048

CLIMBOUT   MEAN        4.915    8955.805       2.20       0.180       328.38        0.536      576.58     0.00031
           STD DEV     8.419     662.439       0.0        0.309        24.29        0.912       35.57     0.00055

APPROACH   MEAN        7.842    4137.551       4.00       0.523       275.84        1.884      493.33     0.00107
           STD DEV     6.332     350.089       0.0        0.422        23.34        1.491       30.43     0.00089

TAXI-IDLE  MEAN       98.643     871.960       7.00      11.508       101.73      115.413      107.92     0.10699
           STD DEV    58.151     196.805       0.0        6.784        22.96       70.759        6.65     0.06461

          TOTAL FOR CYCLE                      MEAN:     43.503      1108.48                  1686.58
                                           STD DEV:      25.319       114.52                   103.94

          LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:     39.030
                                           STD DEV:      23.114

          LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:     25.880
                                           STD DEV:      15.438

          LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:     2.933
                                           STD DEV:       5.627


MODE                  EMISSION     FUEL       TIME IN      NOX         FUEL       LB NOX/       ENERGY      LB NOX/
                        RATE       RATE        MODE       MASS         MASS      1K LB FUEL    # TH-HR     # TH-HR
                       LB/HR      LB/HR        MIN.       LBS.         LBS.

TAXI-IDLF  MEAN        1.433     871.960      19.00       0.454       276.12        1.664      292.91     0.00155
           STD DEV     0.532     196.805       0.0        0.168        62.32        0.478       18.07     0.00055

TAKEOFF    MEAN      148.125   10835.289       0.70       1.728       126.41       13.613      215.83     0.00798
           STD DEV    25.842     821.060       0.0        0.301         9.58        1.656       13.32     0.00106

CLIMBOUT   MEAN       96.218    8955.805       2.20       3.528       328.38       10.720      576.58     0.00610
           STD DEV    14.259     662.439       0.0        0.523        24.29        1.097       35.57     0.00066

APPROACH   MEAN       21.784    4137.551       4.00       1.452       275.84        5.277      493.33     0.00294
           STD DEV     3.099     350.089       0.0        0.207        23.34        0.694       30.43     0.00035

TAXI-IDLE  MEAN        1.433     871.960       7.00       0.167       101.73        1.664      107.92     0.00155
           STD DEV     0.532     196.805       0.0        0.062        22.96        0.478        6.65     0.00055

          TOTAL FOR CYCLE                      MEAN:      7.329      1108.48                  1686.58
                                           STD DEV:       1.090       114.52                   103.94

          LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:      6.646
                                           STD DEV:       0.940

          LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:      4.335
                                           STD DEV:       0.480

          LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:    93.083
                                           STD DEV:      12.371
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MODEL  JT4A                    SAMPLE NUMBER =   8.

MODE                 EMISSION      FUEL       TIME IN        CO          FUEL        LB CO /     ENERGY      LB CO /
                       RATE        RATE        MODE         MASS         MASS      1K LB FUEL   # TH-HR     # TH-HR
                      LB/HR       LB/HR        MIN.         LBS.         LBS.

TAXI-IDLE   MEAN     62.787     1388.763      19.00       19.882       439.78       45.231      277.08     0.07176
         STD DEV     17.688      103.796       0.0         5.601        32.86       11.907        0.0      0.02021

TAKEOFF     MEAN     18.823    15511.203       0.70        0.220       180.96        1.214      204.17     0.00108
         STD DEV      3.994      427.062       0.0         0.047         4.98        0.258        0.0      0.00023

CLIMBOUT    MEAN     18.277    13066.484       2.20        0.670       479.10        1.399      545.42     0.00123
         STD DEV      3.129      240.685       0.0         0.115         8.78        0.235        0.0      0.00021

APPROACH    MEAN     26.326     5993.734       4.00        1.755       399.58        4.412      466.67     0.00376
         STD DEV      9.529      324.933       0.0         0.635        21.66        1.671        0.0      0.00136

TAXI-IDLE   MEAN     62.787     1388.763       7.00        7.325       162.02       45.231      102.08     0.07176
         STD DEV     17.688      103.796       0.0         2.064        12.11       11.907        0.16     0.02021

         TOTAL FOR CYCLE                       MEAN:      29.852      1661.45                  1595.41
                                           STD DEV:        8.042        47.30                     1.51

         LBS POLLUTANT/1K LB FUEL/CYCLE        MEAN:      17.971
                                           STD DEV:        4.802

         LBS POLLUTANT/1K LB TH-HR/CYCLE       MEAN:      18.711
                                           STD DEV:        5.041

         LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:       1.255
                                           STD DEV:        0.266


MODE                 EMISSION      FUEL       TIME IN        HC          FUEL        LB HC /     ENERGY      LB HC /
                       RATE        RATE        MODE         MASS         MASS      1K LB FUEL   # TH-HR     # TH-HR
                      LB/HR       LB/HR        MIN.         LBS.         LBS.

TAXI-IDLE   MEAN     64.828     1388.763      19.00       20.529       439.78       46.766      277.08     0.07409
         STD DEV     12.819      103.796       0.0         4.059        32.86        8.940        0.0      0.01465

TAKEOFF     MEAN      0.674    15511.203       0.70        0.008       180.96        0.043      204.17     0.00004
         STD DEV      0.934      427.062       0.0         0.011         4.98        0.060        0.0      0.00005

CLIMBOUT    MEAN      1.274    13066.484       2.20        0.047       479.10        0.096      545.42     0.00009
         STD DEV      2.120      240.685       0.0         0.078         8.78        0.160        0.0      0.00014

APPROACH    MEAN      3.834     5993.734       4.00        0.256       399.58        0.646      466.67     0.00055
         STD DEV      2.383      324.933       0.0         0.159        21.66        0.413        0.0      0.00034

TAXI-IDLE   MEAN     64.828     1388.763       7.00        7.563       162.02       46.766      102.08     0.07409
         STD DEV     12.819      103.796       0.0         1.496        12.11        8.940        0.16     0.01465

         TOTAL FOR CYCLE                       MEAN:      28.402      1661.45                  1595.41
                                           STD DEV:        5.487        47.30                     1.51

         LBS POLLUTANT/1K LB FUEL/CYCLE        MEAN:      17.071
                                           STD DEV:        3.091

         LBS POLLUTANT/1K LB TH-HR/CYCLE       MEAN:      17.802
                                           STD DEV:        3.439

         LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:       0.449
                                           STD DEV:        0.623


MODE                 EMISSION      FUEL       TIME IN       NOX          FUEL        LB NOX/     ENERGY      LB NOX/
                       RATE        RATE        MODE         MASS         MASS      1K LB FUEL   # TH-HR     # TH-HR
                      LB/HR       LB/HR        MIN.         LBS.         LBS.

TAXI-IDLE   MEAN      2.708     1388.763      19.00        0.857       439.78        1.941      277.08     0.00309
         STD DEV      0.629      103.796       0.0         0.199        32.86        0.374        0.0      0.00072

TAKEOFF     MEAN    236.335    15511.203       0.70        2.757       180.96       15.224      204.17     0.01350
         STD DEV     28.993      427.062       0.0         0.338         4.98        1.714        0.0      0.00166

CLIMBOUT    MEAN    155.298    13066.484       2.20        5.694       479.10       11.881      545.42     0.01044
         STD DEV      9.813      240.685       0.0         0.360         8.78        0.641        0.0      0.00066

APPROACH    MEAN     35.859     5993.734       4.00        2.391       399.58        5.976      466.67     0.00512
         STD DEV      4.203      324.933       0.0         0.280        21.66        0.526        0.0      0.00060

TAXI-IDLE   MEAN      2.708     1388.763       7.00        0.316       162.02        1.941      102.08     0.00309
         STD DEV      0.629      103.796       0.0         0.073        12.11        0.374        0.16     0.00072

         TOTAL FOR CYCLE                       MEAN:      12.015      1661.45                  1595.41
                                           STD DEV:        0.803        47.30                     1.51

         LBS POLLUTANT/1K LB FUEL/CYCLE        MEAN:       7.231
                                           STD DEV:        0.419

         LBS POLLUTANT/1K LB TH-HR/CYCLE       MEAN:       7.531
                                           STD DEV:        0.503

         LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:     157.557
                                           STD DEV:       19.329
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MODEL  JT8D UNDIL REGULAR    SAMPLE NUMBER =   7.

MODE                 EMISSION     FUEL      TIME IN       CO        FUFL       LB CO /     ENERGY      LB CO /
                       RATE       RATE       MODE        MASS       MASS     1K LB FUEL   # TH-HR      # TH-HR
                      LB/HR      LB/HR       MIN.        LBS.       LBS.

TAXI-IDLF  MEAN      41.395     823.275     19.00      13.108     260.70      50.320      266.00      0.04928
           STD DEV   11.148     113.528      0.0        3.550      35.95      13.014        0.0       0.01327
TAKEOFF    MEAN       7.975    8517.727      0.70       0.093      99.37       0.934      163.33      0.00057
           STD DEV    3.354     165.892      0.0        0.039       1.94       0.388        0.0       0.00024
CLIMBOUT   MEAN      10.621    7116.587      2.20       0.389     260.94       1.493      436.33      0.00089
           STD DEV    4.389      95.555      0.0        0.161       3.51       0.617        0.0       0.00037
APPROACH   MEAN      17.920    3445.414      4.00       1.195     229.69       5.210      373.33      0.00320
           STD DEV    1.665     180.022      0.0        0.111      12.00       0.518        0.0       0.00030
TAXI-IDLF  MEAN      41.395     823.275      7.00       4.829      96.05      50.320       98.00      0.04928
           STD DEV   11.148     113.528      0.0        1.301      13.24      13.014        0.14      0.01327
        TOTAL FOR CYCLE                      MEAN:     19.615     946.76                 1337.00
                                         STD DEV:      4.967      49.19                    2.08

        LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:     20.657
                                         STD DEV:      4.947

        LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:     14.671
                                         STD DEV:      3.715

        LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:     0.665
                                         STD DEV:      0.279

MODE                 EMISSION     FUEL      TIME IN       HC        FUEL       LB HC /     ENERGY      LB HC /
                       RATE       RATE       MODE        MASS       MASS     1K LB FUEL   # TH-HR      # TH-HR
                      LB/HR      LB/HR       MIN.        LBS.       LBS.

TAXI-IDLF  MEAN       8.322     823.275     19.00       2.635     260.70      10.102      266.00      0.00991
           STD DEV    3.003     113.528      0.0        0.951      35.95       3.399        0.0       0.00357
TAKEOFF    MEAN       0.373    8517.727      0.70       0.004      99.37       0.043      163.33      0.00003
           STD DEV    0.563     165.892      0.0        0.007       1.94       0.066        0.0       0.00004
CLIMBOUT   MEAN       0.313    7116.582      2.20       0.011     260.94       0.044      436.33      0.00003
           STD DEV    0.459      95.555      0.0        0.017       3.51       0.065        0.0       0.00004
APPROACH   MEAN       1.179    3445.414      4.00       0.079     229.69       0.332      373.33      0.00021
           STD DEV    1.372     180.022      0.0        0.091      12.00       0.368        0.0       0.00024
TAXI-IDLE  MEAN       8.322     823.275      7.00       0.971      96.05      10.102       98.00      0.00991
           STD DEV    3.003     113.526      0.0        0.350      13.24       3.399        0.14      0.00357
        TOTAL FOR CYCLE                      MEAN:      3.701     946.76                 1337.00
                                         STD DEV:      1.276      49.19                    2.08

        LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:      3.901
                                         STD DEV:      1.306

        LBS POLLUTANT/1K LB TH-HR/CYCLF      MEAN:      2.768
                                         STD DEV:      0.954

        LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:     0.311
                                         STD DEV:      0.469

MODE                 EMISSION     FUEL      TIME IN      NOX        FUEL       LB NOX/     ENERGY      LB NOX/
                       RATE       RATE       MODE        MASS       MASS     1K LB FUEL   # TH-HR      # TH-HR
                      LB/HR      LB/HR       MIN.        LBS.       LBS.

TAXI-IDLF  MEAN       1.765     823.275     19.00       0.559     260.70       2.172      266.00      0.00210
           STD DEV    0.257     113.528      0.0        0.081      35.95       0.410        0.0       0.00031
TAKEOFF    MEAN     101.636    8517.727      0.70       1.186      99.37      11.930      163.33      [illegible]726
           STD DEV   14.360     165.892      0.0        0.168       1.94       1.644        0.0       0.0[illegible]33
CLIMBOUT   MEAN      67.746    7116.582      2.20       2.484     260.94       9.517      436.33      0.00569
           STD DEV   11.251      95.555      0.0        0.413       3.51       1.559        0.0       0.00095
APPROACH   MEAN      16.952    3445.414      4.00       1.130     229.69       4.959      373.33      0.00303
           STD DEV    2.870     180.022      0.0        0.191      12.00       1.097        0.0       0.00051
TAXI-IDLF  MEAN       1.765     823.275      7.00       0.206      96.05       2.172       98.00      0.00210
           STD DEV    0.257     113.528      0.0        0.030      13.24       0.410        0.14      0.00031
        TOTAL FOR CYCLF                      MEAN:      5.565     946.76                 1337.00
                                         STD DEV:      0.582      49.19                    2.08

        LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:      5.904
                                         STD DEV:      0.805

        LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:      4.162
                                         STD DEV:      0.435

        LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:    84.697
                                         STD DEV:     11.967
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MODEL  JT8D UNOIL SMOKELESS  SAMPLE NUMBER =  18.

MODE                  EMISSION     FUEL      TIME IN       CO          FUEL       LB CO /      ENERGY      LB CO /
                        RATE       RATE       MODE        MASS         MASS      1K LB FUEL   # TH-HR     # TH-HR
                       LB/HR      LB/HR       MIN.        LBS.         LBS.

TAXI-IDLE   MEAN      37.389     857.216     19.00      11.840       271.45      43.746      275.50      0.04298
            STD DEV   11.750     114.788      0.0        3.721        36.35      13.411        0.54      0.01351

TAKEOFF     MEAN       5.617    8677.555      0.70       0.066       101.24       0.648      169.17      0.00039
            STD DEV    1.997     210.983      0.0        0.023         2.45       0.232        0.11      0.00014

CLIMBOUT    MEAN       6.204    7171.270      2.20       0.227       262.95       0.867      451.92      0.00050
            STD DEV    1.928     160.470      0.0        0.071         5.88       0.274        0.94      0.00016

APPROACH    MEAN      11.960    3572.512      4.00       0.797       238.17       3.420      386.67      0.00206
            STD DEV    4.937     452.440      0.0        0.329        30.16       1.486        0.59      0.00085

TAXI-IDLE   MEAN      37.389     857.216      7.00       4.362       100.01      43.746      101.50      0.04298
            STD DEV   11.750     114.788      0.0        1.371        13.39      13.411        0.06      0.01351

            TOTAL FOR CYCLE                  MEAN:     17.292       973.81                  1384.75
                                          STD DEV:      5.133        67.79                     1.37

            LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:     17.748
                                              STD DEV:      5.109

            LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:     12.488
                                              STD DEV:      3.707

            LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:    0.452
                                                STD DEV:    0.161


MODE                  EMISSION     FUEL      TIME IN       HC          FUEL       LB HC /      ENERGY      LB HC /
                        RATE       RATE       MODE        MASS         MASS      1K LB FUEL   # TH-HR     # TH-HR
                       LB/HR      LB/HR       MIN.        LBS.         LBS.

TAXI-IDLE   MEAN       8.755     857.216     19.00       2.772       271.45      10.131      275.50      0.01006
            STD DEV    5.754     114.788      0.0        1.822        36.35       5.784        0.54      0.00661

TAKEOFF     MEAN       0.381    8677.555      0.70       0.004       101.24       0.044      169.17      0.00003
            STD DEV    0.840     210.983      0.0        0.010         2.45       0.097        0.11      0.00006

CLIMBOUT    MEAN       0.396    7171.270      2.20       0.015       262.95       0.055      451.92      0.00003
            STD DEV    0.736     160.470      0.0        0.027         5.88       0.098        0.94      0.00006

APPROACH    MEAN       0.850    3572.512      4.00       0.057       238.17       0.224      386.67      0.00015
            STD DEV    0.913     452.440      0.0        0.061        30.16       0.195        0.59      0.00016

TAXI-IDLE   MEAN       8.755     857.216      7.00       1.021       100.01      10.131      101.50      0.01006
            STD DEV    5.754     114.788      0.0        0.671        13.39       5.784        0.06      0.00661

            TOTAL FOR CYCLE                  MEAN:      3.869       973.81                  1384.75
                                          STD DEV:      2.481        67.79                     1.37

            LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:      3.948
                                              STD DEV:      2.344

            LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:      2.794
                                              STD DEV:      1.792

            LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:    0.307
                                                STD DEV:    0.676


MODE                  EMISSION     FUEL      TIME IN       NOX         FUEL       LB NOX/      ENERGY      LB NOX/
                        RATE       RATE       MODE        MASS         MASS      1K LB FUEL   # TH-HR     # TH-HR
                       LB/HR      LB/HR       MIN.        LBS.         LBS.

TAXI-IDLE   MEAN       1.841     857.216     19.00       0.583       271.45       2.157      275.50      0.00212
            STD DEV    0.597     114.788      0.0        0.189        36.35       0.717        0.54      0.00069

TAKEOFF     MEAN     133.295    8677.555      0.70       1.555       101.24      15.344      169.17      0.00919
            STD DEV   33.587     210.983      0.0        0.392         2.45       3.825        0.11      0.00232

CLIMBOUT    MEAN      86.972    7171.270      2.20       3.189       262.95      12.111      451.92      0.00706
            STD DEV   19.477     160.470      0.0        0.714         5.88       2.631        0.94      0.00158

APPROACH    MEAN      20.242    3572.512      4.00       1.349       238.17       5.663      386.67      0.00349
            STD DEV    5.826     452.440      0.0        0.308        30.16       1.509        0.59      0.00100

TAXI-IDLE   MEAN       1.841     857.216      7.00       0.215       100.01       2.157      101.50      0.00212
            STD DEV    0.597     114.788      0.0        0.070        13.39       0.717        0.06      0.00069

            TOTAL FOR CYCLE                  MEAN:      6.891       973.81                  1384.75
                                          STD DEV:      1.651        67.79                     1.37

            LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:      7.076
                                              STD DEV:      1.692

            LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:      4.977
                                              STD DEV:      1.192

            LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:  107.249
                                                STD DEV:   27.024
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MODEL  JT8D DIL REGULAR        SAMPLE NUMBER =    7.

 MODE                  EMISSION      FUEL        TIME IN      CO           FUEL        LB CO /      ENERGY       LB CO /
                         RATE        RATE         MODE       MASS          MASS       1K LB FUEL   # TH-HR      # TH-HR
                        LB/HR        LB/HR        MIN.       LBS.          LBS.

TAXI-IDLE   MEAN       39.563      891.680       19.00      12.528        282.37       45.370       266.00       0.04710
          STD DEV      11.685      213.480        0.0        3.700         67.60       10.694         0.0        0.01391
TAKEOFF     MEAN       18.544     8407.422        0.70       0.216         98.09        2.224       163.33       0.00132
          STD DEV      15.916      181.373        0.0        0.186          2.12        1.961         0.0        0.00114
CLIMBOUT    MEAN       19.403     7098.539        2.20       0.711        260.28        2.759       436.33       0.00163
          STD DEV      14.506      179.837        0.0        0.532          6.60        2.135         0.0        0.00122
APPROACH    MEAN       32.325     3458.895        4.00       2.155        230.59        9.468       373.33       0.00577
          STD DEV       9.911      208.301        0.0        0.661         13.89        3.253         0.0        0.00177
TAXI-IDLE   MEAN       39.563      891.680        7.00       4.616        104.03       45.370        98.00       0.04710
          STD DEV      11.685      213.480        0.0        1.363         24.91       10.694         0.14       0.01391
        TOTAL FOR CYCLE                          MEAN:      20.227        975.35                   1337.00
                                              STD DEV:       5.222        105.89                      2.08

        LBS POLLUTANT/1K LB FUEL/CYCLE           MEAN:      20.793
                                              STD DEV:       4.771

        LBS POLLUTANT/1K LB TH-HR/CYCLE          MEAN:      15.128
                                              STD DEV:       3.905

        LBS POLLUTANT/1000K LB TH-HR AT T.O.     MEAN:       1.545
                                              STD DEV:       1.326


 MODE                  EMISSION      FUEL        TIME IN      HC           FUEL        LB HC /      ENERGY       LB HC /
                         RATE        RATE         MODE       MASS          MASS       1K LB FUEL   # TH-HR      # TH-HR
                        LB/HR        LB/HR        MIN.       LBS.          LBS.

TAXI-IDLE   MEAN       11.048      891.680       19.00       3.499        282.37       11.750       266.00       0.01315
          STD DEV       6.439      213.480        0.0        2.039         67.60        5.415         0.0        0.00767
TAKEOFF     MEAN        0.316     8407.422        0.70       0.004         98.09        0.038       163.33       0.00002
          STD DEV       0.321      181.373        0.0        0.004          2.12        0.039         0.0        0.00002
CLIMBOUT    MEAN        0.827     7098.539        2.20       0.030        260.28        0.117       436.33       0.00007
          STD DEV       1.042      179.837        0.0        0.038          6.60        0.146         0.0        0.00009
APPROACH    MEAN        3.343     3458.895        4.00       0.223        230.59        0.977       373.33       0.00060
          STD DEV       2.180      208.301        0.0        0.145         13.89        0.656         0.0        0.00039
TAXI-IDLE   MEAN       11.048      891.680        7.00       1.289        104.03       11.750        98.00       0.01315
          STD DEV       6.439      213.480        0.0        0.751         24.91        5.415         0.14       0.00767
        TOTAL FOR CYCLE                          MEAN:       5.044        975.35                   1337.00
                                              STD DEV:       2.876        105.89                      2.08

        LBS POLLUTANT/1K LB FUEL/CYCLE           MEAN:       5.026
                                              STD DEV:       2.627

        LBS POLLUTANT/1K LB TH-HR/CYCLE          MEAN:       3.773
                                              STD DEV:       2.151

        LBS POLLUTANT/1000K LB TH-HR AT T.O.     MEAN:       0.263
                                              STD DEV:       0.268


 MODE                  EMISSION      FUEL        TIME IN      NOX          FUEL        LB NOX/      ENERGY       LB NOX/
                         RATE        RATE         MODE       MASS          MASS       1K LB FUEL   # TH-HR      # TH-HR
                        LB/HR        LB/HR        MIN.       LBS.          LBS.

TAXI-IDLE   MEAN        2.908      891.680       19.00       0.921        282.37        3.156       266.00       0.00346
          STD DEV       1.454      213.480        0.0        0.460         67.60        1.016         0.0        0.00173
TAKEOFF     MEAN      151.272     8407.422        0.70       1.765         98.09       18.000       163.33       0.01081
          STD DEV      21.703      181.373        0.0        0.253          2.12        2.561         0.0        0.00155
CLIMBOUT    MEAN      100.144     7098.539        2.20       3.672        260.28       14.116       436.33       0.00842
          STD DEV      19.169      179.837        0.0        0.703          6.60        2.679         0.0        0.00161
APPROACH    MEAN       28.048     3458.895        4.00       1.870        230.59        8.128       373.33       0.00501
          STD DEV       3.055      208.301        0.0        0.204         13.89        0.957         0.0        0.00055
TAXI-IDLE   MEAN        2.908      891.680        7.00       0.339        104.03        3.156        98.00       0.00346
          STD DEV       1.454      213.480        0.0        0.170         24.91        1.016         0.14       0.00173
        TOTAL FOR CYCLE                          MEAN:       8.567        975.35                   1337.00
                                              STD DEV:       1.082        105.89                      2.08

        LBS POLLUTANT/1K LB FUEL/CYCLE           MEAN:       8.840
                                              STD DEV:       1.154

        LBS POLLUTANT/1K LB TH-HR/CYCLE          MEAN:       6.408
                                              STD DEV:       0.809

        LBS POLLUTANT/1000K LB TH-HR AT T.O.     MEAN:     126.060
                                              STD DEV:      18.086
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MODEL  JT8D DIL SMOKELESS    SAMPLE NUMBER =  26.


MODE                EMISSION     FUEL       TIME IN       CO          FUEL        LB CO /     ENERGY      LB CO /
                      RATE       RATE        MODE        MASS         MASS      1K LB FUEL   # TH-HR     # TH-HR
                     LB/HR       LB/HR       MIN.        LBS.         LBS.

TAXI-IDLE   MEAN     33.402     959.329     19.00       10.577       303.79       34.495      275.50     0.03800
            STD DEV  17.385      59.663     0.0          5.505        18.91       15.561        9.73     0.01835

TAKEOFF     MEAN      7.490    8754.512      0.70        0.087       102.14        0.855      169.17     0.00052
            STD DEV   5.447     375.860     0.0          0.064         4.38        0.629        5.95     0.00038

CLIMBOUT    MEAN      8.892    7336.766      2.20        0.326       269.01        1.214      451.91     0.00072
            STD DEV   4.848     266.697     0.0          0.178         9.77        0.671       15.92     0.00040

APPROACH    MEAN     18.184    3408.656      4.00        1.212       227.24        5.335      386.67     0.00313
            STD DEV   6.147     167.198     0.0          0.410        11.15        1.758       13.61     0.00105

TAXI-IDLE   MEAN     33.402     959.329      7.00        3.897       111.92       34.495      101.50     0.03800
            STD DEV  17.385      59.663     0.0          2.028         6.96       15.561        3.57     0.01835

         TOTAL FOR CYCLE                          MEAN:  16.100      1014.10                  1384.75
                                              STD DEV:   7.611        42.47                    48.69

         LBS POLLUTANT/1K LB FUEL/CYCLE           MEAN:  15.741
                                              STD DEV:   6.671

         LBS POLLUTANT/1K LB TH-HR/CYCLE          MEAN:  11.519
                                              STD DEV:   5.038

         LBS POLLUTANT/1000K LB TH-HR AT T.O.     MEAN:   0.604
                                              STD DEV:   0.442


MODE                EMISSION     FUEL       TIME IN       HC          FUEL        LB HC /     ENERGY      LB HC /
                      RATE       RATE        MODE        MASS         MASS      1K LB FUEL   # TH-HR     # TH-HR
                     LB/HR       LB/HR       MIN.        LBS.         LBS.

TAXI-IDLE   MEAN      6.994     959.329     19.00        2.215       303.79        7.284      275.50     0.00801
            STD DEV   3.306      59.663     0.0          1.047        18.91        3.240        9.73     0.00367

TAKEOFF     MEAN      0.778    8754.512      0.70        0.009       102.14        0.087      169.17     0.00005
            STD DEV   1.094     375.860     0.0          0.013         4.38        0.122        5.95     0.00007

CLIMBOUT    MEAN      0.921    7336.766      2.20        0.034       269.01        0.124-     451.91     0.00007
            STD DEV   0.994     266.697     0.0          0.036         9.77        0.134       15.92     0.00008

APPROACH    MEAN      1.753    3408.656      4.00        0.117       227.24        0.515      386.67     0.00030
            STD DEV   0.884     167.198     0.0          0.059        11.15        0.262       13.61     0.00015

TAXI-IDLE   MEAN      6.994     959.329      7.00        0.816       111.92        7.284      101.50     0.00801
            STD DEV   3.306      59.663     0.0          0.386         6.96        3.240        3.57     0.00367

         TOTAL FOR CYCLE                          MEAN:   3.190      1014.10                  1384.75
                                              STD DEV:   1.473        42.47                    48.69

         LBS POLLUTANT/1K LB FUEL/CYCLE           MEAN:   3.139
                                              STD DEV:   1.388

         LBS POLLUTANT/1K LB TH-HR/CYCLE          MEAN:   2.295
                                              STD DEV:   1.027

         LBS POLLUTANT/1000K LB TH-HR AT T.O.     MEAN:   0.613
                                              STD DEV:   0.862


MODE                EMISSION     FUEL       TIME IN      NOX          FUEL        LB NOX/     ENERGY      LB NOX/
                      RATE       RATE        MODE        MASS         MASS      1K LB FUEL   # TH-HR     # TH-HR
                     LB/HR       LB/HR       MIN.        LBS.         LBS.

TAXI-IDLE   MEAN      2.913     959.329     19.00        0.923       303.79        3.051      275.50     0.00334
            STD DEV   1.232      59.663     0.0          0.390        18.91        1.252        9.73     0.00139

TAKEOFF     MEAN    197.742    8754.512      0.70        2.307       102.14       22.513      169.17     0.01360
            STD DEV  35.161     375.860     0.0          0.410         4.38        3.393        5.95     0.00211

CLIMBOUT    MEAN    131.017    7336.766      2.20        4.804       269.01       17.822      451.91     0.01061
            STD DEV  19.775     266.697     0.0          0.725         9.77        2.333       15.92     0.00140

APPROACH    MEAN     30.850    3408.656      4.00        2.057       227.24        9.055      386.67     0.00532
            STD DEV   4.724     167.198     0.0          0.315        11.15        1.307       13.61     0.00081

TAXI-IDLE   MEAN      2.913     959.329      7.00        0.340       111.92        3.051      101.50     0.00334
            STD DEV   1.232      59.663     0.0          0.144         6.96        1.252        3.57     0.00139

         TOTAL FOR CYCLE                          MEAN:  10.430      1014.10                  1384.75
                                              STD DEV:   1.594        42.47                    48.69

         LBS POLLUTANT/1K LB FUEL/CYCLE           MEAN:  10.274
                                              STD DEV:   1.429

         LBS POLLUTANT/1K LB TH-HR/CYCLE          MEAN:   7.520
                                              STD DEV:   1.027

         LBS POLLUTANT/1000K LB TH-HR AT T.O.     MEAN: 158.640
                                              STD DEV:  24.647
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MODEL   JT9D                  SAMPLE NUMBER =   9.


 MODE                EMISSION      FUEL       TIME IN        CO         FUEL       LB CO /     ENERGY       LB CO /
                       RATE        RATE        MODE         MASS        MASS      1K LB FUEL   # TH-HR      # TH-HR
                      LB/HR       LB/HR        MIN.         LBS.        LBS.


TAXI-IDLE   MEAN     101.869     1737.835      19.00       32.259      550.31       58.124      988.88      0.03277
            STD DEV   27.782      192.909      0.0          8.798       61.09       11.125       23.39      0.00956

TAKEOFF     MEAN       8.291    17052.313       0.70        0.097      198.94        0.487      520.46      0.00019
            STD DEV    5.363      821.375      0.0          0.063        9.58        0.320       12.30      0.00012

CLIMBOUT    MEAN      11.741    14316.879       2.20        0.430      524.95        0.823     1390.38      0.00031
            STD DEV    3.670      820.809      0.0          0.135       30.09        0.264       32.86      0.00010

APPROACH    MEAN      32.570     5203.895       4.00        2.171      346.93        6.419      892.22      0.00243
            STD DEV   11.269      468.229      0.0          0.751       31.21        2.808       21.14      0.00080

TAXI-IDLE   MEAN     101.869     1737.835       7.00       11.885      202.75       58.124      364.32      0.03277
            STD DEV   27.782      192.909      0.0          3.241       22.51       11.125        8.60      0.00956

           TOTAL FOR CYCLE                     MEAN:   46.842     1823.88                  4156.26
                                           STD DEV:   11.876      139.32                     98.25

           LBS POLLUTANT/1K LB FUEL/CYCLE      MEAN:   25.512
                                           STD DEV:    5.061

           LBS POLLUTANT/1K LB TH-HR/CYCLE     MEAN:   11.316
                                           STD DEV:    3.081

           LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:    0.218
                                              STD DEV:    0.143


 MODE                EMISSION      FUEL       TIME IN        HC         FUEL       LB HC /     ENERGY       LB HC /
                       RATE        RATE        MODE         MASS        MASS      1K LB FUEL   # TH-HR      # TH-HR
                      LB/HR       LB/HR        MIN.         LBS.        LBS.


TAXI-IDLE   MEAN      27.313     1737.835      19.00        8.649      550.31       15.366      988.88      0.00881
            STD DEV   22.277      192.909      0.0          7.054       61.09       11.403       23.39      0.00736

TAKEOFF     MEAN       2.953    17052.313       0.70        0.034      198.94        0.173      520.46      0.00007
            STD DEV    2.215      821.375      0.0          0.026        9.58        0.131       12.30      0.00005

CLIMBOUT    MEAN       2.647    14316.879       2.20        0.097      524.95        0.184     1390.38      0.00007
            STD DEV    1.806      820.809      0.0          0.066       30.09        0.127       32.86      0.00005

APPROACH    MEAN       2.997     5203.895       4.00        0.200      346.93        0.590      892.22      0.00022
            STD DEV    1.376      468.229      0.0          0.092       31.21        0.288       21.14      0.00010

TAXI-IDLE   MEAN      27.313     1737.835       7.00        3.187      202.75       15.366      364.32      0.00881
            STD DEV   22.277      192.909      0.0          2.599       22.51       11.403        8.60      0.00736

           TOTAL FOR CYCLE                     MEAN:   12.167     1823.88                  4156.26
                                           STD DEV:    9.768      139.32                     98.25

           LBS POLLUTANT/1K LB FUEL/CYCLE      MEAN:    6.594
                                           STD DEV:    5.021

           LBS POLLUTANT/1K LB TH-HR/CYCLE     MEAN:    2.950
                                           STD DEV:    2.427

           LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:    0.779
                                              STD DEV:    0.587


 MODE                EMISSION      FUEL       TIME IN        NOX        FUEL       LB NOX/     ENERGY       LB NOX/
                       RATE        RATE        MODE         MASS        MASS      1K LB FUEL   # TH-HR      # TH-HR
                      LB/HR       LB/HR        MIN.         LBS.        LBS.


TAXI-IDLE   MEAN       6.061     1737.835      19.00        1.919      550.31        3.497      988.88      0.00194
            STD DEV    2.194      192.909      0.0          0.695       61.09        1.210       23.39      0.00070

TAKEOFF     MEAN     719.951    17052.313       0.70        8.399      198.94       41.990      520.46      0.01617
            STD DEV  151.642      821.375      0.0          1.769        9.58        7.069       12.30      0.00359

CLIMBOUT    MEAN     458.604    14316.879       2.20       16.615      524.95       31.892     1390.38      0.01212
            STD DEV   81.739      820.809      0.0          2.997       30.09        4.201       32.86      0.00233

APPROACH    MEAN      54.101     5203.895       4.00        3.607      346.93       10.457      892.22      0.00404
            STD DEV    5.727      468.229      0.0          0.382       31.21        1.323       21.14      0.00044

TAXI-IDLE   MEAN       6.061     1737.835       7.00        0.707      202.75        3.497      364.32      0.00194
            STD DEV    2.194      192.909      0.0          0.256       22.51        1.210        8.60      0.00070

           TOTAL FOR CYCLE                     MEAN:   31.448     1823.88                  4156.26
                                           STD DEV:    5.129      139.32                     98.25

           LBS POLLUTANT/1K LB FUEL/CYCLE      MEAN:   17.227
                                           STD DEV:    2.231

           LBS POLLUTANT/1K LB TH-HR/CYCLE     MEAN:    7.581
                                           STD DEV:    1.333

           LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:  188.690
                                              STD DEV:   41.875
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MODEL  SPEY MK/511          SAMPLE NUMBER =   4.

MODE                 EMISSION     FUEL       TIME IN      CO          FUEL        LB CO /      ENERGY      LB CO /
                       RATE       RATE        MODE       MASS         MASS      1K LB FUEL    # TH-HR      # TH-HR
                      LB/HR       LB/HR       MIN.       LBS.         LBS.

TAXI-IDLE   MEAN      60.173     661.542     19.00      19.055       209.49       89.861      144.40      0.13196
            STD DEV   19.601     110.889      0.0        6.207        35.12       20.325        0.0       0.04298

TAKEOFF     MEAN      14.718    7625.230      0.70       0.166        88.96        1.870      133.00      0.00125
            STD DEV    2.944     150.022      0.0        0.034         1.75        0.426        0.25      0.00026

CLIMBOUT    MEAN      15.251    6354.934      2.20       0.559       233.01        2.401      355.30      0.00157
            STD DEV    1.804      60.839      0.0        0.066         2.24        0.298        0.0       0.00019

APPROACH    MEAN      39.068    3051.668      4.00       2.605       203.44       12.868      304.00      0.00857
            STD DEV   10.078     123.028      0.0        0.672         8.21        3.550        0.0       0.00221

TAXI-IDLE   MEAN      60.173     661.542      7.00       7.020        77.18       89.861       53.20      0.13196
            STD DEV   19.601     110.889      0.0        2.287        12.94       20.325        0.0       0.04298

            TOTAL FOR CYCLE                      MEAN:  29.405       812.09                   989.90
                                             STD DEV:    9.054        43.96                     0.0

            LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:  35.942
                                             STD DEV:    9.707

            LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:  29.705
                                             STD DEV:    9.147

            LBS POLLUTANT/1000K LB TH-HR AT T.O. MEAN:   1.455
                                             STD DEV:    0.301

MODE                 EMISSION     FUEL       TIME IN      HC          FUEL        LB HC /      ENERGY      LB HC /
                       RATE       RATE        MODE       MASS         MASS      1K LB FUEL    # TH-HR      # TH-HR
                      LB/HR       LB/HR       MIN.       LBS.         LBS.

TAXI-IDLE   MEAN      66.051     661.542     19.00      20.916       209.49      102.865      144.40      0.14485
            STD DEV   11.083     110.889      0.0        3.510        35.12       28.897        0.0       0.02430

TAKEOFF     MEAN       0.0      7625.230      0.70       0.0          88.96        0.0        133.00      0.0
            STD DEV    0.0       150.022      0.0        0.0           1.75        0.0          0.25      0.0

CLIMBOUT    MEAN       0.242    6354.934      2.20       0.009       233.01        0.038      355.30      0.00003
            STD DEV    0.221      60.839      0.0        0.008         2.24        0.035        0.0       0.00002

APPROACH    MEAN       4.224    3051.668      4.00       0.282       203.44        1.394      304.00      0.00093
            STD DEV    4.447     123.028      0.0        0.296         8.21        1.451        0.0       0.00098

TAXI-IDLE   MEAN      66.051     661.542      7.00       7.706        77.18      102.865       53.20      0.14485
            STD DEV   11.083     110.889      0.0        1.293        12.94       28.897        0.0       0.02430

            TOTAL FOR CYCLE                      MEAN:  28.912       812.09                   989.90
                                             STD DEV:    4.542        43.96                     0.0

            LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:  35.776
                                             STD DEV:    6.654

            LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:  29.207
                                             STD DEV:    4.588

            LBS POLLUTANT/1000K LB TH-HR AT T.O. MEAN:   0.0
                                             STD DEV:    0.0

MODE                 EMISSION     FUEL       TIME IN      NOX         FUEL        LB NOX/      ENERGY      LB NOX/
                       RATE       RATE        MODE       MASS         MASS      1K LB FUEL    # TH-HR      # TH-HR
                      LB/HR       LB/HR       MIN.       LBS.         LBS.

TAXI-IDLE   MEAN       0.849     661.542     19.00       0.269       209.49        1.271      144.40      0.00186
            STD DEV    0.381     110.889      0.0        0.121        35.12        0.501        0.0       0.00084

TAKEOFF     MEAN     153.012    7625.230      0.70       1.785        88.96       20.081      133.00      0.01342
            STD DEV    9.845     150.022      0.0        0.115         1.75        1.519        0.25      0.00086

CLIMBOUT    MEAN     114.759    6354.934      2.20       4.208       233.01       18.073      355.30      0.01184
            STD DEV   13.724      60.839      0.0        0.503         2.24        2.316        0.0       0.00142

APPROACH    MEAN      30.446    3051.668      4.00       2.030       203.44        9.939      304.00      0.00668
            STD DEV    5.197     123.028      0.0        0.346         8.21        1.331        0.0       0.00114

TAXI-IDLE   MEAN       0.849     661.542      7.00       0.099        77.18        1.271       53.20      0.00186
            STD DEV    0.381     110.889      0.0        0.044        12.94        0.501        0.0       0.00084

            TOTAL FOR CYCLE                      MEAN:   8.391       812.09                   989.90
                                             STD DEV:    0.842        43.96                     0.0

            LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:  10.392
                                             STD DEV:    1.524

            LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:   8.476
                                             STD DEV:    0.850

            LBS POLLUTANT/1000K LB TH-HR AT T.O. MEAN: 156.591
                                             STD DEV:   10.075
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DATE:   6/17/71

TEST ORGANIZATION:   S W R I KELLY

ENGINE SUPPLIER:    USAF, KELLY AFB

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:    1     ENGINE TYPE AND MODEL:  T56-A7B                  SERIAL NUMBER:    AE-102635

                              RATED HORSEPOWER:      3755.

     ENGINE TOTAL TIME:                                        -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                           0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                               0. HRS
          N2 COMPRESSOR OVERHAUL:                              -0. HRS
          COMBUSTOR CAN REPLACEMENT:                            0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:               0. HRS
          N1 TURBINE OVERHAUL:                                  0. HRS
          N2 TURBINE OVERHAUL:                                 -0. HRS

     FUEL: JP-4                    FUEL H/C RATIO:   1.995

OPERATIONAL DATA ***************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    91.00    FINISH    90.00

     ATMOSPHERIC PRESSURE:              START    28.93    FINISH    28.93

     INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0186

     RELATIVE HUMIDITY:                      52.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    0.50

NUMBER OF TESTS:   8

COMMENTS:

F/A CALCULATION BASED ON EXHAUST COMPOSITION 2ND LAST RUN
SHP DATA WAS BACK-CALCULATED


 ELAPSED    TEST            POWER                   ENGINE                MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE       TURBINE
  TIME      MODE     THRUST,LBS  PERCENT            SPEED                   FUEL      AIR FLOW     F/A      DISCHARGE     PRESSURE       INLET
                         OR       RATED              RPM                    FLOW      LB/SEC                   TEMP         RATIO         TEMP
                        SHP       T.O.         N1            N2             LB/HR                           DEGREES F        EPR        DEGREES F

   0.0      1/ 0     2268.00        60     13800.00       -0.00           1450.00      30.00     0.013400     -0.00         -0.00        1510.00
   5.00     2/ 1     3238.00        86     13800.00       -0.00           1800.00      30.00     0.016700     -0.00         -0.00        1700.00
  10.50     3/ 2     3502.00        93     13800.00       -0.00           1450.00      30.00     0.013400     -0.00         -0.00        1510.00
  15.00     4/ 3       -0.00         0     13300.00       -0.00            820.00      27.90     0.008200     -0.00         -0.00        1128.00
  18.00     5/ 4       -0.00         0     14000.00       -0.00           2050.00      30.80     0.018500     -0.00         -0.00        1860.00
  19.50     4/ 5       -0.00         0     13400.00       -0.00            810.00      28.40     0.007900     -0.00         -0.00        1120.00
  21.00     7/ 4       -0.00         0      9950.00       -0.00            560.00      14.70     0.010600     -0.00         -0.00        1150.00
  24.00     8/ 7       -0.00         0     13300.00       -0.00            705.00      27.90     0.007000     -0.00         -0.00        1050.00


 POWER     EXHAUST      EXHAUST          CO          CO          THC        NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
PERCENT      GAS          GAS           (WET)         2         (WET)      (WET)        2           X
 RATED       TEMP       PRESSURE        PPMV        (WET)       PPMV       PPMV       (WET)       (WET)
 T.O.     DEGREES F       PSIA                    PERCENT V                           PPMV        PPMV

  60        -0.00        -0.00          31.00        2.57        0.0       -0.00      -0.00       81.00      -0.00      -0.00        -0.00
  86        -0.00        -0.00          28.00        3.06        0.0       -0.00      -0.00      115.00      -0.00      -0.00        -0.00
  93        -0.00        -0.00          26.00        3.29        0.0       -0.00      -0.00      124.00      -0.00      -0.00        -0.00
   0        -0.00        -0.00          28.00        1.55        0.0       -0.00      -0.00       32.00      -0.00      -0.00        -0.00
   0        -0.00        -0.00          24.00        3.74        0.0       -0.00      -0.00      127.00      -0.00      -0.00        -0.00
   0        -0.00        -0.00          28.00        1.57        0.0       -0.00      -0.00       32.00      -0.00      -0.00        -0.00
   0        -0.00        -0.00         287.00        2.13      235.00      -0.00      -0.00       28.00      -0.00      -0.00        -0.00
   0        -0.00        -0.00          30.00        1.40        2.00      -0.00      -0.00       26.00      -0.00      -0.00        -0.00


 POWER     MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
PERCENT       CO         HC         NO2        CO2         NO         NOX         CO         HC        NO2        CO2         NO         NOX
 RATED      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
 T.O.      LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

  60         2.41       0.0       -0.00     3135.09      -0.00      10.33       3.49       0.0       -0.00     4545.88     -0.00      14.98
  86         1.83       0.0       -0.00     3136.00      -0.00      12.32       3.29       0.0       -0.00     5644.80     -0.00      22.18
  93         1.58       0.0       -0.00     3136.39      -0.00      12.36       2.29       0.0       -0.00     4547.77     -0.00      17.92
   0         3.60       0.0       -0.00     3133.21      -0.00       6.76       2.95       0.0       -0.00     2569.23     -0.00       5.55
   0         1.28       0.0       -0.00     3136.86      -0.00      11.14       2.63       0.0       -0.00     6430.55     -0.00      22.83
   0         3.56       0.0       -0.00     3133.28      -0.00       6.68       2.88       0.0       -0.00     2537.96     -0.00       5.41
   0        26.27      12.32      -0.00     3063.79      -0.00       4.21      14.71       6.90      -0.00     1715.72     -0.00       2.36
   0         4.27       0.16      -0.00     3131.72      -0.00       6.08       3.01       0.11      -0.00     2207.86     -0.00       4.29


 POWER           CO               CO               THC               NO               NO               NO
PERCENT                            2                                                   2                X
 RATED      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR      LB/1K HP-HR
 T.O.

  60           1.539          2004.356            0.0            -0.000           -0.000            6.604
  86           1.015          1743.298            0.0            -0.000           -0.000            6.849
  93           0.653          1298.621            0.0            -0.000           -0.000            5.117
***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
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DATE:  7/26/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  137     ENGINE TYPE AND MODEL:  JT 3C - 7               SERIAL NUMBER:     633734

                             RATED THRUST:         12000.

     ENGINE TOTAL TIME:                            18499. HRS

     TIME SINCE HOT SECTION OVERHAUL:              2614. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                  2614. HRS
          N2 COMPRESSOR OVERHAUL:                  2614. HRS
          COMBUSTOR CAN REPLACEMENT:               2614. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:  2614. HRS
          N1 TURBINE OVERHAUL:                     2614. HRS
          N2 TURBINE OVERHAUL:                     2614. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    57.20    FINISH    57.20

     ATMOSPHERIC PRESSURE:              START    29.94    FINISH    29.93

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0094

     RELATIVE HUMIDITY:                     94.00 PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:     5.00

     SAMPLE LINE TRANSPORT TIME, SEC:     5.00

 NUMBER OF TESTS:   3

 COMMENTS:

  ENGINE OVERHAULED AND CARBO - BLASTED
  8D PROBF USED FOR SAMPLING
  EXHAUST GAS TEMPERATURE IN DEGREES C
  EXHAUST GAS PRESSURE IN INCHES HG.


  CLOCK      TEST           POWER                  ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE      TURBINE
  TIME       MODE     THRUST,LBS  PERCENT           SPEED               FUEL    AIR FLOW      F/A      DISCHARGE     PRESSURE      INLET
                          OR       RATED             RPM                FLOW     LB/SEC                  TEMP          RATIC        TEMP
                          SHP      T.O.         N1          N2         LB/HR                           DEGREES F       EPR       DEGREES F

    0.73     1/ 0     7834.00        65      5816.00     9164.00     6369.00     -0.00    -0.000000       -0.00         2.14         -0.00
  737.00     2/ 1     9169.00        76      6055.00     9381.00     7465.00     -0.00    -0.000000       -0.00         2.36         -0.00
  742.00     3/ 2    10961.00        91      6416.00     9699.00     9186.00     -0.00    -0.000000       -0.00         2.66         -0.00


  POWER    EXHAUST      EXHAUST        CO         CO        THC       NO        NO        NO      ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS         (WET)        2       (WET)     (WET)       2         X
  RATED      TEMP       PRESSURE      PPMV       (WET)     PPMV      PPMV      (WET)     (WET)
  T.O.    DEGREES F       PSIA                 PERCENT V                       PPMV      PPMV

   65      464.00        62.60        60.00       2.30      2.85     50.40     -0.00     43.00      -0.00      -0.00      -C.00
   76      508.00        68.70        58.00       2.50      2.40     62.00     -0.00     64.20      -0.00      -0.00      -0.00
   91      576.00        76.80        30.00       2.80      0.90     84.00     -0.00     88.0C      -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     L3/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   65        5.23      0.14     -0.00    3147.29     7.21      6.15     33.28      0.91     -0.00   20045.09    45.92     39.18
   76        4.65      0.11     -0.00    3148.28     8.16      8.45     34.70      0.82     -C.00   23501.93    60.93     63.09
   91        2.15      0.04     -0.00    3152.41     9.89     10.36     19.75      0.34     -0.00   28958.03    90.82     95.14


  POWER          CO               CO              THC               NO               NO               NO
 PERCENT                           2                                                  2                X
  RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

   65          4.248         2558.730           0.116            5.862           -0.000            5.091
   76          3.785         2563.194           0.090            6.645           -C.000            6.881
   91          1.802         2641.915           0.031            8.286           -0.000            8.680
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DATE:   7/ 7/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ******************************************************************************************

     CAL ID NUMBER:   64    ENGINE TYPE AND MODEL:  JT3D                    SERIAL NUMBER:    P-668816

                            RATED THRUST:          21000.

     ENGINE TOTAL TIME:                                   -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         -0. HRS
          N2 COMPRESSOR OVERHAUL:                         -0. HRS
          COMBUSTOR CAN REPLACEMENT:                      -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         -0. HRS
          N1 TURBINE OVERHAUL:                            -0. HRS
          N2 TURBINE OVERHAUL:                            -0. HRS

     FUEL: JP-4                   FUEL H/C RATIO:   2.000

OPERATIONAL DATA *************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   85.00   FINISH   87.00

     ATMOSPHERIC PRESSURE:              START   29.92   FINISH   29.94

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0084

     RELATIVE HUMIDITY:                        27.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.0C,  FLOW RATE, LITERS/MIN:    2.00

     SAMPLE LINE TRANSPORT TIME, SEC:     1.00

NUMBER OF TESTS:   9

COMMENTS:

 BURNER : BM


 CLOCK      TEST            POWER                    ENGINE             MEASURED    GAS GEN      CALC      COMPRESSOR     ENGINE       TURBINE
 TIME       MODE      THRUST,LBS  PERCENT            SPEED                FUEL     AIR FLOW      F/A       DISCHARGE     PRESSURE       INLET
                          OR       RATED              RPM                 FLOW      LB/SEC                    TEMP        RATIO         TEMP
                         SHP       T.O.         N1            N2         LB/HR                             DEGREES F       EPR       DEGREES F

1429.00     1/ 0       840.00         3      1865.00     5495.00       1017.00      29.09    0.009710       -0.00         1.02         -0.00
1443.00     2/ 1      1350.00         6      2365.00     6440.00       1266.00      40.70    0.008640       -0.00         1.04         -0.00
1443.00     3/ 2      1850.00         8      2745.00     7025.00       1501.00      49.26    0.008460       -0.00         1.05         -0.00
1453.00     4/ 3      6279.00        29      4470.00     8510.00       3197.00      97.66    0.009070       -0.00         1.20         -0.00
1512.00     5/ 4      9597.00        45      5245.00     9020.00       4559.00     125.93    0.010280       -0.00         1.34         -0.00
1518.00     6/ 5     11606.00        55      5615.00     9260.00       5636.00     140.66    0.011130       -0.00         1.44         -0.00
1529.00     7/ 6     13564.00        64      5950.00     9475.00       6705.00     155.27    0.012000       -0.00         1.55         -0.00
1541.00     8/ 7     15550.00        74      6280.00     9695.00       7924.00     170.32    0.012920       -0.00         1.68         -0.00
1551.00     9/ 8     17609.00        83      6700.00    10000.00       9450.00     183.25    0.014320       -0.00         1.84         -0.00


 POWER    EXHAUST      EXHAUST          CO          CO         THC        NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
PERCENT     GAS          GAS          (WET)          2        (WET)      (WET)        2           X
 RATED     TEMP       PRESSURE         PPMV       (WET)        PPMV       PPMV      (WET)       (WET)
 T.O.    DEGREES F      PSIA                    PERCENT V                            PPMV        PPMV

   3       585.00       15.00         867.60        1.28     1055.80       1.90       4.00        5.90     -0.00       -0.00       -0.00
   6       595.00       15.19         645.60        1.41      459.80       1.00       5.30        6.30     -0.00       -0.00       -0.00
   8       605.00       15.38         455.70        1.48      222.00       4.10       5.10        9.20     -0.00       -0.00       -0.00
  29       655.00       17.39          93.50        1.77       14.30      28.90      10.00       38.90     -0.00       -0.00       -0.00
  45         7.25       19.36          41.50        2.18        2.00       0.0        2.90        2.90     -0.00       -0.00       -0.00
  55       770.00       20.73          27.20        2.37        5.70       0.0        5.40        5.40     -0.00       -0.00       -0.00
  64       825.00       22.20          19.70        2.56        3.30       0.0        6.30        6.30     -0.00       -0.00       -0.00
  74       885.00       24.12          14.30        2.77        5.60       0.0       17.10       17.10     -0.00       -0.00       -C.00
  83       980.00       26.24          10.70        3.13        4.50       0.0        8.40        8.40     -0.00       -0.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   3      117.68     82.02      0.89    2727.85      0.42      1.31    119.68     83.41      0.91    2774.22     0.43      1.34
   6       84.79     34.59      1.14    2909.64      0.22      1.36    107.34     43.79      1.45    3683.60     0.27      1.72
   8       58.80     16.40      1.08    3000.36      0.87      1.95     88.25     24.62      1.62    4503.54     1.30      2.93
  29       10.49      0.92      1.84    3118.75      5.32      7.17     33.52      2.94      5.89    9970.64    17.02     22.91
  45        3.79      0.10      0.44    3131.50      0.0       0.44     17.30      0.48      1.99   14276.50     0.0       1.99
  55        2.29      0.27      0.75    3133.40      0.0       0.75     12.90      1.55      4.21   17659.81     0.0       4.21
  64        1.54      0.15      0.81    3134.93      0.0       0.81     10.29      0.99      5.41   21019.68     0.0       5.41
  74        1.03      0.23      2.02    3135.49      0.0       2.02      8.16      1.83     16.03   24845.64     0.0      16.03
  83        0.68      0.16      0.88    3136.22      0.0       0.88      6.45      1.55      8.31   29637.29     0.0       8.31


 POWER          CO               CO               THC               NO               NO               NO
PERCENT                           2                                                   2                X
 RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
 T.O.

   3         142.473         3302.639           99.298            0.512            1.079            1.591
   6          79.514         2728.595           32.434            0.202            1.072            1.275
   8          47.705         2434.344           13.310            0.705            0.877            1.582
  29           5.339         1587.935            0.468            2.710            0.938            3.648
  45           1.802         1487.600            0.050            0.0              0.207            0.207
  55           1.111         1521.611            0.133            0.0              0.362            0.362
  64           0.759         1549.667            0.073            0.0              0.399            0.399
  74           0.525         1597.790            0.118            0.0              1.031            1.031
  83           0.366         1683.077            0.088            0.0              0.472            0.472
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DATE:   6/29/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:  121    ENGINE TYPE AND MODEL:  JT3D -3B                SERIAL NUMBER:    669424

                            RATED THRUST:        18000.

     ENGINE TOTAL TIME:                             9199. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                   9199. HRS
          N2 COMPRESSOR OVERHAUL:                  12169. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
          N1 TURBINE OVERHAUL:                         0. HRS
          N2 TURBINE OVERHAUL:                         0. HRS

     FUEL: JET - A             FUEL H/C RATIO:   1.920
OPERATIONAL DATA *******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   68.00   FINISH   66.20

     ATMOSPHERIC PRESSURE:              START   29.98   FINISH   30.35

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0105

     RELATIVE HUMIDITY:                    72.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    1.50

     SAMPLE LINE TRANSPORT TIME, SEC:    5.00

 NUMBER OF TESTS:   4

 COMMENTS:

  EXHAUST GAS PRESSURE IN INCHES HG


  CLOCK      TEST          POWER               ENGINE           MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE     TURBINE
  TIME       MODE    THRUST,LBS  PERCENT       SPEED              FUEL     AIR FLOW     F/A     DISCHARGE    PRESSURE     INLET
                         OR       RATED         RPM               FLOW      LB/SEC                 TEMP        RATIO       TEMP
                        SHP       T.O.      N1        N2         LB/HR                          DEGREES F      EPR      DEGREES F

 1327.00     1/ 0     9200.00      51    5179.00   8993.00     4857.00     -0.00   -0.000000      -0.00        1.37       -0.00
 1335.00     2/ 1    13250.00      73    5910.00   9484.00     7145.00     -0.00   -0.000000      -0.00        1.61       -0.00
 1339.00     3/ 2    16650.00      92    6475.00   9886.00     9467.00     -0.00   -0.000000      -0.00        1.84       -0.00
 1447.00     4/ 3     1000.00       5    1999.00   5810.00     1180.00     -0.00   -0.000000      -0.00       -0.00       -0.00


  POWER    EXHAUST     EXHAUST        CO         CO        THC       NO        NO         NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS        (WET)         2       (WET)    (WET)        2          X
  RATED      TEMP      PRESSURE      PPMV      (WET)      PPMV     PPMV      (WET)      (WET)
  T.O.    DEGREES F      PSIA                PERCENT V                       PPMV       PPMV

   51       721.40      40.80      130.00      2.28      14.40     45.00     -0.00      47.00     -0.00      -0.00      -0.00
   73       838.40      47.60       80.00      2.66       3.60     73.20     -0.00      74.00     -0.00      -0.00      -0.00
   92       957.20      54.70       60.00      3.10       3.00     -0.00     -0.00      -0.00     -0.00      -0.00      -0.00
    5       555.80      31.00      900.00      1.55      -0.00      3.00     -0.00       3.50     -0.00      -0.00      -0.00


  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
  RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   51      11.38      0.72     -0.00   3136.03      6.47      6.76     55.27      3.51     -0.00  15231.69     31.43     32.82
   73       6.02      0.16     -0.00   3146.00      9.05      9.15     43.03      1.11     -0.00  22478.18     64.67     65.37
   92       3.88      0.11     -0.00   3149.49     -0.00     -0.00     36.73      1.05     -0.00  29816.21     -0.00     -0.00
    5     110.23     -0.00     -0.00   2982.70      0.60      0.70    130.07     -0.00     -0.00   3519.58      0.71      0.83


  POWER          CO              CO              THC              NO              NO              NO
 PERCENT                          2                                                2               X
  RATED     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR
  T.O.

   51          6.008         1655.619          0.381           3.416          -0.000           3.568
   73          3.247         1696.467          0.084           4.880          -0.000           4.934
   92          2.206         1790.764          0.063          -0.000          -0.000          -0.000
    5        130.066         3519.585         -0.000           0.712          -0.000           0.831
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DATE:   8/ 4/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ************************************************************************************************************

     CAL ID NUMBER:  313    ENGINE TYPE AND MODEL:  JT3D -3B                   SERIAL NUMBER:   P643558B

                            RATED THRUST:         18000.

     ENGINE TOTAL TIME:                                4158. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  4158. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      4158. HRS
          N2 COMPRESSOR OVERHAUL:                      4158. HRS
          COMBUSTOR CAN REPLACEMENT:                   4158. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      4158. HRS
          N1 TURBINE OVERHAUL:                         4158. HRS
          N2 TURBINE OVERHAUL:                         4158. HRS

     FUEL: JP-4 TF             FUEL H/C RATIO:    2.020

OPERATIONAL DATA *******************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    68.00    FINISH    67.00

     ATMOSPHERIC PRESSURE:              START    29.05    FINISH    29.05

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0116

     RELATIVE HUMIDITY:                      76.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

NO2 DETERMINED BY SUBTRACTION.  THIS IS THE FIRST OF THREE TESTS ON THIS ENGINE
THE FUEL USED CONTAINED NO CI-2.  HYDROCARBON EMISSIONS FROM THIS ENGINE WERE
ABNORMALLY HIGH DUE TO AN OIL LEAK.  NO HYDROCARBON DATA ARE THUS REPORTED FOR
THIS TEST.


ELAPSED     TEST           POWER               ENGINE              MEASURED    GAS GEN       CALC     COMPRESSOR      ENGINE       TURBINE
 TIME       MODE     THRUST,LBS  PERCENT        SPEED                FUEL     AIR FLOW        F/A     DISCHARGE      PRESSURE       INLET
                         OR       RATED          RPM                 FLOW      LB/SEC                    TEMP          RATIO         TEMP
                        SHP       T.O.      N1          N2           LB/HR                             DEGREES F        EPR        DEGREES F

   0.0      6/ 0      9000.00       50    5380.00     9160.00      5010.00     126.20     0.011000       -0.00          1.37         -0.00
   5.00     1/ 6     11180.00       62    5830.00     9370.00      6310.00     143.60     0.012200       -0.00         -0.00         -0.00
   7.00     2/ 1     13300.00       73    6200.00     6930.00      7610.00     160.00     0.013200       -0.00         -0.00         -0.00
  11.00     3/ 2     15420.00       85    6550.00     9930.00      9330.00     174.40     0.014800       -0.00         -0.00         -0.00
  15.00     4/ 3       960.00        5      -0.00     5890.00      1000.00      30.80     0.009000       -0.00         -0.00         -0.00


 POWER    EXHAUST       EXHAUST          CO          CO         THC        NO          NO         NO       ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS           GAS          (WET)          2        (WET)      (WET)         2          X
 RATED      TEMP        PRESSURE        PPMV       (WET)        PPMV       PPMV       (WET)      (WET)
 T.O.    DEGREES F        PSIA                    PERCENT V                            PPMV       PPMV

   50      716.00          4.60         47.00        2.24       26.00      33.00       2.00      35.00      -0.00      -0.00      -0.00
   62      777.00          6.50         25.00        2.48       26.00      43.00       3.00      46.00      -0.00      -0.00      -0.00
   73      844.00          8.50         12.00        2.69       26.00      57.00       4.00      61.00      -0.00      -0.00      -0.00
   85      939.00         10.90         11.00        0.01       16.00      83.00       2.00      85.00      -0.00      -0.00      -0.00
    5      536.00          0.30        627.00        1.68     1240.00       3.00       5.00       8.00      -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   50       4.17      1.32      0.29   3123.06      4.81      5.10     20.89      6.62      1.46  15646.54     24.10     25.56
   62       2.01      1.19      0.40   3126.81      5.67      6.06     12.66      7.54      2.50  19730.18     35.76     38.26
   73       0.89      1.10      0.49   3128.82      6.93      7.42      6.76      8.39      3.70  23810.33     52.74     56.44
   85     172.72    143.89     51.58   2467.12   2140.67   2192.26   1611.48   1342.45    481.26  23018.21  19972.47  20453.74
    5      66.98     75.87      0.88   2819.87      0.53      1.40     66.98     75.87      0.88   2819.87      0.53      1.40


 POWER         CO                 CO                 THC                 NO                 NO                 NO
PERCENT                            2                                                          2                  X
 RATED    LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
 T.O.

   50          2.322           1738.505              0.736              2.677              0.162              2.840
   62          1.132           1764.775              0.674              3.199              0.223              3.422
   73          0.508           1790.250              0.631              3.966              0.278              4.244
   85        104.506           1492.750             87.059           1295.232             31.210           1326.442
    5         69.771           2937.363             79.027              0.548              0.914              1.462
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DATE: 8/ 4/71

TEST ORGANIZATION: S W R I TWA

ENGINE SUPPLIER: T W A

ENGINE DATA **

CAL ID NUMBER: 314 ENGINE TYPE AND MODEL: JT3D -3B SERIAL NUMBER: P643558B

RATED THRUST: 18000.

ENGINE TOTAL TIME: 4158. HRS

TIME SINCE HOT SECTION OVERHAUL: 4158. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	4158. HRS
N2 COMPRESSOR OVERHAUL:	4158. HRS
COMBUSTOR CAN REPLACEMENT:	4158. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	4158. HRS
N1 TURBINE OVERHAUL:	4158. HRS
N2 TURBINE OVERHAUL:	4158. HRS

FUEL: JP-4 TF FUEL H/C RATIO: 2.020

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 66.00 FINISH 66.00

ATMOSPHERIC PRESSURE: START 29.04 FINISH 29.04

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0124

RELATIVE HUMIDITY: 81.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 5

COMMENTS:

NO2 DETERMINED BY SUBTRACTION. THIS IS THE SECOND OF THREE TESTS ON THIS ENGINE. THE FUEL USED CONTAINED 0.1% BY VOLUME CI-2. HYDROCARBON DATA ARE NOT REPORTED BECAUSE OF AN OIL LEAK.

ELAPSED TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	6/ 0	9080.00	50	5390.00	9020.00	5100.00	127.30	0.011100	-0.00	1.37	-0.00
6.00	1/ 6	11200.00	62	5830.00	9370.00	6300.00	143.70	0.012200	-0.00	-0.00	-0.00
10.00	2/ 1	13420.00	74	6210.00	9630.00	7660.00	161.00	0.013200	-0.00	-0.00	-0.00
13.00	3/ 2	15500.00	86	6660.00	9930.00	9340.00	175.40	0.014800	-0.00	-0.00	-0.00
16.00	4/ 3	980.00	5	2020.00	5880.00	1030.00	31.80	0.009000	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
50	725.00	4.80	66.00	2.22	-0.00	31.00	2.00	33.00	-0.00	-0.00	-0.00
62	775.00	6.50	34.00	2.48	-0.00	42.00	2.00	44.00	-0.00	-0.00	-0.00
74	844.00	8.50	16.00	2.68	28.00	55.00	3.00	58.00	-0.00	-0.00	-0.00
86	937.00	10.90	11.00	2.99	-0.00	77.00	3.00	80.00	-0.00	-0.00	-0.00
5	540.00	0.30	674.00	1.66	-0.00	4.00	4.00	8.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
50	5.91	-0.00	0.29	3123.95	4.56	4.85	30.15	-0.00	1.50	15932.16	23.26	24.76
62	2.73	-0.00	0.26	3128.95	5.54	5.80	17.20	-0.00	1.66	19712.39	34.90	36.56
74	1.19	1.19	0.37	3128.10	6.71	7.08	9.10	9.13	2.80	23961.28	51.41	54.21
86	0.73	-0.00	0.33	3132.09	8.43	8.76	6.85	-0.00	3.07	29253.70	78.76	81.82
5	77.81	-0.00	0.76	3010.99	0.76	1.52	80.14	-0.00	0.78	3101.32	0.78	1.56

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_x LB/1K#TH-HR
50	3.320	1754.644	-0.000	2.561	0.165	2.727
62	1.536	1760.035	-0.000	3.116	0.148	3.264
74	0.678	1785.490	0.680	3.831	0.209	4.040
86	0.442	1887.335	-0.000	5.081	0.198	5.279
5	81.777	3164.609	-0.000	0.797	0.797	1.594

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DATE:   8/ 4/71

TEST ORGANIZATION:  S W R I TWA

ENGINE SUPPLIER:    T W A

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  315    ENGINE TYPE AND MODEL:  JT3D -3B                 SERIAL NUMBER:   P643558B

                            RATED THRUST:        18000.

     ENGINE TOTAL TIME:                                 4158. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   4158. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       4158. HRS
          N2 COMPRESSOR OVERHAUL:                       4158. HRS
          COMBUSTOR CAN REPLACEMENT:                    4158. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       4158. HRS
          N1 TURBINE OVERHAUL:                          4158. HRS
          N2 TURBINE OVERHAUL:                          4158. HRS

     FUEL: JP-4 TF              FUEL H/C RATIO:   2.020

OPERATIONAL DATA *************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   66.00   FINISH   66.00

     ATMOSPHERIC PRESSURE:              START   29.04   FINISH   29.04

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0124

     RELATIVE HUMIDITY:                        81.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   5

COMMENTS:

 NO2 DETERMINED BY SUBTRACTION.  THIS TEST IS THE LAST OF THREE TESTS RUN ON
 THIS ENGINE.  THE FUEL USED CONTAINED 0.0125% CI-2 BY VOLUME.  HYDROCARBON DATA
 ARE NOT REPORTED BECAUSE OF AN OIL LEAK.


 FLAPSED    TEST            POWER                ENGINE             MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE      TURBINE
  TIME      MODE     THRUST,LBS  PERCENT          SPEED               FUEL     AIR FLOW      F/A     DISCHARGE     PRESSURE      INLET
                         OR       RATED            RPM                FLOW      LB/SEC                  TEMP         RATIO        TEMP
                        SHP       T.O.       N1          N2          LB/HR                          DEGREES F       EPR       DEGREES F

   0.0      6/ 0     9000.00       50     5350.00     9020.00      5120.00     126.30   0.011300       -0.00        1.37        -0.00
   5.00     1/ 6    11250.00       62     5830.00     9480.00      6320.00     143.70   0.012200       -0.00       -0.00        -0.00
   9.00     2/ 1    13250.00       73     6200.00     9630.00      7610.00     160.00   0.013200       -0.00       -0.00        -0.00
  11.30     3/ 2    15460.00       85     6660.00     9950.00      9360.00     175.40   0.014800       -0.00       -0.00        -0.00
  13.00     4/ 3      980.00        5     2015.00     5910.00      1000.00      31.80   0.008700       -0.00       -0.00        -0.00


 POWER    EXHAUST      EXHAUST         CO         CO        THC       NO        NO         NO      ALDEHYDES    SMOKE   PARTICULATES
PERCENT     GAS          GAS          (WET)        2       (WET)     (WET)       2          X
 RATED     TEMP       PRESSURE        PPMV      (WET)      PPMV      PPMV      (WET)      (WET)
 T.O.   DEGREES F       PSIA                  PERCENT V                        PPMV       PPMV

  50       714.00        4.80         72.00      2.26     -0.00     29.00      1.00      30.00     -0.00       -0.00       -0.00
  62       777.00        6.50         53.00      2.47     -0.00     45.00      2.00      47.00     -0.00       -0.00       -0.00
  73       844.00        8.50         26.00      2.70     -0.00     59.00      3.00      62.00     -0.00       -0.00       -0.00
  85       939.00       11.00         22.00      3.02     -0.00     83.00      3.00      86.00     -0.00       -0.00       -0.00
   5       550.00        0.30        675.00      1.62     -0.00      4.00      5.00       9.00     -0.00       -0.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  50        6.33     -0.00      0.14   3123.29      4.19      4.33     32.42     -0.00      0.74  15991.25     21.45     22.19
  62        4.27     -0.00      0.26   3126.53      5.95      6.22     26.98     -0.00      1.67  19759.68     37.63     39.31
  73        1.92     -0.00      0.36   3130.23      7.15      7.51     14.60     -0.00      2.77  23821.02     54.42     57.18
  85        1.45     -0.00      0.33   3130.96      9.00      9.32     13.59     -0.00      3.04  29305.79     84.20     87.24
   5       79.77     -0.00      0.97   3007.91      0.78      1.75     79.77     -0.00      0.97   3007.91      0.78      1.75


 POWER          CO               CO             THC              NO               NO              NO
PERCENT                           2                                                2               X
 RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR
 T.O.

  50          3.603         1776.805          -0.000            2.383           0.082           2.456
  62          2.399         1756.416          -0.000            3.345           0.149           3.494
  73          1.102         1797.813          -0.000            4.107           0.209           4.316
  85          0.879         1895.588          -0.000            5.446           0.197           5.643
   5         81.394         3069.298          -0.000            0.792           0.990           1.783
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DATE: 7/29/71

TEST ORGANIZATION: U.S. BUREAU OF MINES

ENGINE SUPPLIER: PRATT AND WHITNEY

ENGINE DATA **

CAL ID NUMBER: 338 ENGINE TYPE AND MODEL: JT3D -3B SERIAL NUMBER: 645643

RATED THRUST: 18000.

ENGINE TOTAL TIME: 11171. HRS

TIME SINCE HOT SECTION OVERHAUL: 161. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	11171. HRS
N2 COMPRESSOR OVERHAUL:	5192. HRS
COMBUSTOR CAN REPLACEMENT:	-0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	5192. HRS
N1 TURBINE OVERHAUL:	13176. HRS
N2 TURBINE OVERHAUL:	11176. HRS

FUEL: JET - A FUEL H/C RATIO: 1.920

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 67.00 FINISH 68.00

ATMOSPHERIC PRESSURE: START 29.11 FINISH 29.11

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0120

RELATIVE HUMIDITY: 78.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 137.00, FLOW RATE, LITERS/MIN: 16.00

SAMPLE LINE TRANSPORT TIME, SEC: 0.99

NUMBER OF TESTS: 7

COMMENTS:

H/C CAL EATIMATED
SAMPLF LINE TEMP. AVERAGED
PROBE LOCATED 30" FROM TAILPIPE
LOST SAMPLE FLOW ON LAST RUN

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
910.00	4/ 0	710.00	3	1840.0C	5560.00	1060.00	-0.00	-0.000000	-0.00	1.02	-0.00
1015.00	4/ 4	850.00	4	1930.00	5555.00	1060.00	-0.00	-0.000000	-0.00	1.02	-0.00
1020.00	5/ 4	11310.00	62	5760.00	9280.00	6048.00	160.00	-0.000000	-0.00	1.5C	-0.00
1030.00	4/ 5	950.00	5	1960.00	5650.00	960.00	-0.00	-0.000000	-0.00	1.02	-0.00
1045.00	1/ 4	10900.00	60	5700.00	9250.00	5770.00	154.00	-0.000000	-0.00	1.47	-0.00
1050.00	2/ 1	13410.00	74	6150.00	9560.00	7210.00	175.00	-0.000000	-0.00	1.62	-0.00
1055.00	3/ 2	16000.00	88	6670.00	9920.00	9100.00	197.00	-0.000000	-0.00	1.87	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_x (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
3	565.00	14.66	855.00	1.43	2117.00	1.90	4.00	5.90	-0.00	-0.00	-0.00
4	565.00	14.66	815.00	1.35	2030.00	1.60	5.00	6.60	-0.00	-0.00	-0.00
62	790.00	20.79	21.50	2.31	2.80	50.20	10.00	60.20	0.56	-0.00	-C.00
5	550.00	14.66	735.00	1.32	1469.00	1.40	6.00	7.40	37.20	-0.00	-C.00
60	775.00	20.49	33.30	2.31	3.00	48.30	10.00	58.30	0.47	-0.00	-0.00
74	845.00	22.60	22.00	2.55	2.20	68.50	11.00	79.50	0.28	-0.00	-0.00
88	940.00	25.60	16.50	2.83	-0.00	-0.00	-0.00	-0.00	0.15	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
3	99.43	141.00	0.76	2612.85	0.36	1.13	105.39	149.46	0.81	2769.62	0.38	1.19
4	100.15	142.87	1.01	2606.58	0.32	1.33	106.16	151.44	1.07	2762.97	0.34	1.41
62	1.87	0.14	1.43	3152.57	7.16	8.59	11.29	0.84	8.63	19066.75	43.32	51.94
5	95.84	109.70	1.29	2704.35	0.30	1.58	92.00	105.31	1.23	2596.17	0.29	1.52
60	2.89	0.15	1.43	3150.94	6.89	8.31	16.68	0.86	8.23	18180.91	39.74	47.97
74	1.73	0.10	1.42	3152.90	8.85	10.28	12.48	0.71	10.25	22732.40	63.84	74.09
88	1.17	-0.00	-0.00	3154.05	-0.00	-0.00	10.65	-0.00	-0.00	28701.85	-0.00	-0.00

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_x LB/1K#TH-HR
3	148.441	3900.880	210.501	0.542	1.141	1.643
4	124.895	3250.557	178.167	0.403	1.259	1.661
62	0.999	1685.832	0.074	3.830	0.763	4.593
5	96.847	2732.814	110.857	0.303	1.299	1.602
60	1.530	1667.973	0.079	3.646	0.755	4.401
74	0.931	1695.183	0.053	4.760	0.764	5.525
88	0.666	1793.865	-0.000	-0.000	-0.000	-0.000

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DATE:  7/29/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA ********************************************************************************************

     CAL ID NUMBER:  342    ENGINE TYPE AND MODEL:  JT3D -3B              SERIAL NUMBER:  667944

                            RATED THRUST:        18000.

     ENGINE TOTAL TIME:                             9380. HRS

     TIME SINCE HOT SECTION OVERHAUL:               2931. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                   9380. HRS
          N2 COMPRESSOR OVERHAUL:                   9380. HRS
          COMBUSTOR CAN REPLACEMENT:                  -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:   2931. HRS
          N1 TURBINE OVERHAUL:                      9380. HRS
          N2 TURBINE OVERHAUL:                      9380. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   74.00   FINISH   74.00

     ATMOSPHERIC PRESSURE:              START   29.30   FINISH   29.30

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0140

     RELATIVE HUMIDITY:                    78.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  137.00,  FLOW RATE, LITERS/MIN:   16.00

     SAMPLE LINE TRANSPORT TIME, SEC:    0.99

NUMBER OF TESTS:  1

COMMENTS:

 H/C CAL ESTIMATED
 SAMPLE LINE TEMP. AVERAGED
 DATA FOR UNTRIMMED IDLE ONLY.
 ENGINE SHUTDOWN & REMOVED FROM TEST CELL DUE TO OIL LEAK.
 PROBE 10" DOWNSTREAM


 CLOCK      TEST          POWER                  ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE      TURBINE
 TIME       MODE    THRUST,LBS  PERCENT          SPEED               FUEL     AIR FLOW      F/A      DISCHARGE     PRESSURE      INLET
                        OR       RATED            RPM                FLOW      LB/SEC                   TEMP         RATIO        TEMP
                       SHP       T.O.       N1          N2          LB/HR                            DEGREES F        EPR      DEGREES F

 115.00     4/ 0      600.00        3    1720.00    5140.00       1000.00      -0.00    -0.000000      -0.00        -0.00        -0.00


POWER     EXHAUST     EXHAUST          CO          CO          THC        NO         NO          NO      ALDEHYDES     SMOKE    PARTICULATES
PERCENT     GAS         GAS           (WET)         2         (WET)      (WET)        2           X
RATED      TEMP       PRESSURE        PPMV        (WET)       PPMV       PPMV       (WET)       (WET)
T.O.     DEGREES F      PSIA                    PERCENT V                           PPMV-        PPMV

   3       587.00      14.63        1090.00        0.98    2959.00       1.90       4.00        5.90      56.70       -0.00       -0.00


POWER     MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO        NOX
RATED      LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
T.O.      LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   3      158.09    245.79      0.95   2233.21      0.45      1.41    158.09    245.79      0.95   2233.21      0.45      1.41


POWER           CO               CO                THC                NO                NO                NO
PERCENT                           2                                                        2                 X
RATED      LB/1K#TH-HR      LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
T.O.

   3        263.476          3722.017           409.642             0.754             1.588             2.343
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DATE: 8/10/71

TEST ORGANIZATION: PRATT & WHITNEY

ENGINE SUPPLIER: PRATT AND WHITNEY

ENGINE DATA **

CAL ID NUMBER: 356 ENGINE TYPE AND MODEL: JT3D -3B SERIAL NUMBER: P-668821

RATED THRUST: 18000.

ENGINE TOTAL TIME: -0. HRS

TIME SINCE HOT SECTION OVERHAUL: -0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	-0. HRS
N2 COMPRESSOR OVERHAUL:	-0. HRS
COMBUSTOR CAN REPLACEMENT:	-0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	-0. HRS
N1 TURBINE OVERHAUL:	-0. HRS
N2 TURBINE OVERHAUL:	-0. HRS

FUEL: JP-4 FUEL H/C RATIO: 2.000

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 86.00 FINISH 83.00

ATMOSPHERIC PRESSURE: START 29.66 FINISH 29.05

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0115

RELATIVE HUMIDITY: -0.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 2.00

SAMPLE LINE TRANSPORT TIME, SEC: 1.00

NUMBER OF TESTS: 6

COMMENTS:

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1751.00	1/ 0	5000.00	27	4210.00	8315.00	2791.00	89.11	0.008700	-0.00	1.16	-0.00
1843.00	3/ 1	8850.00	49	5240.00	9015.00	4634.00	125.14	0.010290	-0.00	1.34	-0.00
1850.00	4/ 3	10700.00	59	5610.00	9240.00	5559.00	141.44	C.010900	-0.00	1.44	-0.00
1908.00	5/ 4	12600.00	69	5950.00	9460.00	6667.00	156.93	0.011800	-0.00	1.55	-0.00
1918.00	6/ 5	14500.00	80	6280.00	9680.00	7845.00	170.22	0.012800	-0.00	1.68	-0.00
1923.00	7/ 6	16400.00	91	6690.00	9975.00	9408.00	183.99	0.014200	-0.00	1.84	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
27	640.00	16.91	110.60	1.72	8.00	22.60	3.00	25.60	-0.00	-0.00	-0.00
49	725.00	19.36	48.50	2.60	8.00	40.90	7.80	48.70	-0.00	-0.00	-0.00
59	760.00	20.72	32.40	2.23	8.00	52.30	6.90	59.20	-C.00	-0.00	-0.00
69	810.00	22.29	2[illegible].60	2.51	8.00	66.40	4.80	71.20	-0.00	-0.00	-0.00
80	870.00	24.00	[illegible].60	2.79	8.00	88.20	6.40	94.60	-0.00	-0.00	-0.00
91	965.00	26.24	[illegible].70	3.12	8.00	121.60	4.70	126.30	-0.00	-0.00	-C.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
27	12.75	0.53	0.57	3116.26	4.28	4.85	35.59	1.47	1.59	8697.47	11.95	13.53
49	3.72	0.35	0.98	3130.94	5.15	6.13	17.23	1.63	4.55	14509.78	23.86	28.41
59	2.90	0.41	1.01	3132.07	7.68	8.69	16.10	2.28	5.63	17411.18	42.69	48.32
69	1.72	0.36	0.63	3134.05	8.67	9.29	11.44	2.43	4.18	20894.70	57.78	61.96
80	1.12	0.33	0.75	3135.09	10.36	11.11	8.75	2.57	5.90	24594.80	81.28	87.18
91	0.75	0.29	0.49	3135.77	12.78	13.27	7.04	2.76	4.65	29501.28	120.20	124.85

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_X LB/1K#TH-HR
27	7.119	1739.495	0.295	2.389	0.317	2.707
49	1.946	1639.410	0.184	2.696	0.514	3.210
59	1.505	1627.213	0.213	3.990	0.526	4.516
69	0.908	1658.310	0.193	4.586	0.332	4.918
80	0.604	1696.193	0.177	5.606	0.407	6.012
91	0.429	1798.859	0.168	7.329	0.283	7.613

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DATE:  7/20/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ****************************************************************************************************

    CAL ID NUMBER:  410    ENGINE TYPE AND MODEL:  JT3D-7                    SERIAL NUMBER:    671088

                          RATED THRUST:          19000.

    ENGINE TOTAL TIME:                            6266. HRS

    TIME SINCE HOT SECTION OVERHAUL:              6266. HRS

    TIME SINCE:

        N1 COMPRESSOR OVERHAUL:                     -0. HRS
        N2 COMPRESSOR OVERHAUL:                     -0. HRS
        COMBUSTOR CAN REPLACEMENT:                  -0. HRS
        FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     -0. HRS
        N1 TURBINE OVERHAUL:                        -0. HRS
        N2 TURBINE OVERHAUL:                        -0. HRS

    FUEL:  JET - A            FUEL H/C RATIO:  1.920

OPERATIONAL DATA ***********************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START    57.74    FINISH    57.20

    ATMOSPHERIC PRESSURE:              START    29.85    FINISH    29.81

    INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0090

    RELATIVE HUMIDITY:                    88.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    5.00

    SAMPLE LINE TRANSPORT TIME, SEC:    5.00

NUMBER OF TESTS:   3

COMMENTS:

 EXHAUST GAS PRESSURE IN INCHES HG.
 PROBE LOCATED 15.25 IN. FROM TAILPIPE.
PRE-REPAIR ENGINE.


 CLOCK      TEST           POWER              ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE      TURBINE
  TIME      MODE     THRUST,LBS  PERCENT       SPEED              FUEL     AIR FLOW      F/A      DISCHARGE     PRESSURE      INLET
                        OR        RATED         RPM               FLOW      LB/SEC                   TEMP          RATIO        TEMP
                        SHP       T.O.      N1         N2         LB/HR                           DEGREES F        EPR      DEGREES F

 2144.00    1/ 0      9432.00      49     5091.00    8951.00    5079.00     -0.00   -0.000000      -0.00          1.36        -0.00
 2151.00    2/ 1     13889.00      73     5787.00    9459.00    7474.00     -0.00   -0.000000      -0.00          1.60        -0.00
 2154.00    3/ 2     17441.00      91     6287.00    9802.00    9719.00     -0.00   -0.000000      -0.00          1.83        -0.00


 POWER    EXHAUST      EXHAUST         CO         CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT    GAS          GAS          (WET)         2       (WET)     (WET)       2         X
 RATED     TEMP       PRESSURE        PPMV       (WET)      PPMV      PPMV     (WET)     (WET)
 T.O.    DEGREES F      PSIA                   PERCENT V                        PPMV      PPMV

   49     728.60       40.30        100.00       2.00      69.00     36.00     -0.00     40.00     -0.00      -0.00      -0.00
   73     831.20       47.10         70.00       2.80      27.00     72.00     -0.00     76.00     -0.00      -0.00      -0.00
   91     923.00       53.90         60.00       3.20      21.00    106.00     -0.00    112.00     -0.00      -0.00      -0.00


 POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT     CO        HC       NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO       NOX
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   49      9.96      3.94     -0.00    3129.44     5.89      6.54     50.58     19.99     -0.00   15894.45    29.91     33.23
   73      5.00      1.11     -0.00    3144.99     8.45      8.92     37.40      8.26     -0.00   23505.67    63.19     66.70
   91      3.76      0.75     -0.00    3147.92    10.90     11.52     36.51      7.32     -0.00   30594.64   105.95    111.94


 POWER          CO               CO               THC               NO                NO                NO
PERCENT                           2                                                    2                 X
 RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
 T.O.

   49         5.363          1685.162           2.119            3.171            -0.000            3.523
   73         2.693          1692.395           0.595            4.549            -0.000            4.802
   91         2.093          1754.179           0.420            6.075            -0.000            6.418
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DATE:  7/26/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:  139    ENGINE TYPE AND MODEL:  JT4A-9              SERIAL NUMBER:     611870

                         RATED THRUST:        16800.

     ENGINE TOTAL TIME:                               17581. HRS

     TIME SINCE HOT SECTION OVERHAUL:                 17581. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        -0. HRS
          N2 COMPRESSOR OVERHAUL:                        -0. HRS
          COMBUSTOR CAN REPLACEMENT:                     -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        -0. HRS
          N1 TURBINE OVERHAUL:                           -0. HRS
          N2 TURBINE OVERHAUL:                           -0. HRS

     FUEL:  JET - A            FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    59.00   FINISH   57.20

     ATMOSPHERIC PRESSURE:              START    29.94   FINISH   29.98

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0090

     RELATIVE HUMIDITY:                     94.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:     5.00

     SAMPLE LINE TRANSPORT TIME, SEC:    5.00

NUMBER OF TESTS:  3

COMMENTS:

 EXHAUST GAS TEMPERATURE IN DEGREES C
 EXHAUST GAS PRESSURE IN INCHES HG.
EXTERNAL OIL LEAK
JT3C-7 PROBE USED


 CLOCK      TEST          POWER                    ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE      TURBINE
 TIME       MODE    THRUST,LBS  PERCENT             SPEED               FUEL    AIR FLOW      F/A     DISCHARGE    PRESSURE      INLET
                        OR        RATED              RPM                FLOW     LB/SEC                  TEMP        RATIC        TEMP
                       SHP        T.O.        N1          N2           LB/HR                          DEGREES F      EPR       DEGREES F

 2156.00    1/ 0    10855.00       64     5605.0C**********     8450.00     -0.00   -0.000000      -0.00         2.06         -0.00
 2158.00    2/ 1    11872.00       70     5754.00    8308.00    9292.00     -0.00   -0.000000      -0.00         2.17         -0.00
 2201.00    3/ 2    14938.00       88     6252.00    8656.00   12206.00     -0.00   -0.000000      -0.00         2.49         -0.00


 POWER    EXHAUST       EXHAUST          CO         CO        THC       NO        NO         NO      ALDEHYDES    SMOKE    PARTICULATES
PERCENT     GAS           GAS           (WET)        2       (WET)     (WET)       2          X
 RATED     TEMP        PRESSURE         PPMV      (WET)      PPMV      PPMV     (WET)      (WET)
 T.O.    DEGREES F       PSIA                    PERCENT V                       PPMV       PPMV

   64      438.00        61.60          60.00      2.90      2.55     91.00     -0.00      96.00      -0.00      -0.00      -0.00
   70      462.00        64.80          60.00      2.43      2.10     62.00     -0.00      69.00      -0.00      -0.00      -0.00
   88      547.00        74.50          70.00      2.35      2.25     57.00     -0.00      60.00      -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC       NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO       NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   64       4.15      0.10     -0.00   3149.10     10.33     10.90     35.04      0.85     -0.00  26609.87     87.29     92.09
   70       4.95      0.10     -0.00   3147.84      8.40      9.34     45.97      0.92     -0.00  29249.77     78.02     86.83
   88       5.96      0.11     -0.00   3146.22      7.98      8.40     72.80      1.34     -0.00  38402.72     97.38    102.50


 POWER          CO                CO               THC               NO                NO                NO
PERCENT                            2                                                    2                 X
 RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

   64          3.228          2451.393            0.079             8.042            -0.000             8.483
   70          3.872          2463.761            0.078             6.572            -0.000             7.313
   88          4.874          2570.808            0.090             6.519            -0.000             6.862
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DATE:   7/27/71

TEST ORGANIZATION:   UNITED/EPA

ENGINE SUPPLIER:     UNITED AIRLINES

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  140    ENGINE TYPE AND MODEL:  JT4A-9                SERIAL NUMBER:     610155

                           RATED THRUST:           16800.

     ENGINE TOTAL TIME:                            16751. HRS

     TIME SINCE HOT SECTION OVERHAUL:              16751. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                     -0. HRS
          N2 COMPRESSOR OVERHAUL:                     -0. HRS
          COMBUSTOR CAN REPLACEMENT:                  -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     -0. HRS
          N1 TURBINE OVERHAUL:                        -0. HRS
          N2 TURBINE OVERHAUL:                        -0. HRS

     FUEL:  JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  S[illegible]   57.20   FINISH   55.40

     ATMOSPHERIC PRESSURE:                  START   29.97   FINISH   29.96

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0083

     RELATIVE HUMIDITY:                       00.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:     5.00

     SAMPLE LINE TRANSPORT TIME, SEC:     5.00

NUMBER OF TESTS:   3

COMMENTS:

 EXHAUST GAS TEMPERATURE IN DEGREES C
 EXHAUST GAS PRESSURE IN INCHES HG
 JT3C-7 PROBE USED


 CLOCK      TEST           POWER                  ENGINE           MEASURED    GAS GEN       CALC     COMPRESSOR     ENGINE      TURBINE
  TIME      MODE     THRUST,LBS  PERCENT           SPEED              FUEL     AIR FLOW       F/A     DISCHARGE    PRESSURE      INLET
                         OR       RATED             RPM               FLOW      LB/SEC                   TEMP        RATIO        TEMP
                        SHP       T.O.        N1          N2         LB/HR                            DEGREES F       EPR       DEGREES F

 1216.00     1/ 0    10842.00       64     5574.00     8308.00     8617.00     -0.00    -0.000000      -0.00         2.05        -0.00
 1222.00     2/ 1    11885.00       70     5728.00     8423.00     9518.00     -0.00    -0.000000      -0.00         2.16        -0.00
 1228.00     3/ 2    14757.00       87     6195.00     8763.00    12267.00     -0.00    -0.000000      -0.00         2.47        -0.00


  POWER    EXHAUST     EXHAUST         CO         CO        THC       NO        NO        NO      ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS         (WET)         2       (WET)    (WET)        2         X
  RATED     TEMP      PRESSURE       PPMV       (WET)      PPMV      PPMV     (WET)     (WET)
  T.O.   DEGREES F      PSIA                  PERCENT V                        PPMV      PPMV

   64      440.00      61.30        45.00       2.30       1.80     61.00     -0.00     64.00      -0.00      -0.00      -0.00
   70      463.00      64.70        55.00       2.45       1.50     68.00     -0.00     72.00      -0.00      -0.00      -0.00
   87      546.00      73.70        55.00       2.75       1.50     94.40     -0.00    102.00      -0.00      -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   64        3.92      0.09     -0.00   3149.48      8.73      9.16     33.79      0.77     -0.00  27139.09     75.25     78.95
   70        4.50      0.07     -0.00   3148.63      9.14      9.67     42.82      0.67     -0.00  29968.63     86.95     92.07
   87        4.01      0.06     -0.00   3149.42     11.30     12.21     49.18      0.77     -0.00  38633.90    138.64    149.80


  POWER          CO                CO                THC                NO                NO                NO
 PERCENT                            2                                                      2                 X
  RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
  T.O.

   64          3.117          2503.144            0.071             6.940            -0.000             7.231
   70          3.603          2521.551            0.056             7.316            -0.000             7.747
   87          3.332          2618.005            0.052             9.395            -0.000            10.151
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DATE: 8/ 3/71

TEST ORGANIZATION: U.S. BUREAU OF MINES

ENGINE SUPPLIER: AMERICAN AIRLINES

ENGINE DATA **

CAL ID NUMBER: 343 ENGINE TYPE AND MODEL: JT8D-1 SERIAL NUMBER: 653435

RATED THRUST: 14000.

ENGINE TOTAL TIME: 11614. HRS

TIME SINCE HOT SECTION OVERHAUL: 7277. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	11614. HRS
N2 COMPRESSOR OVERHAUL:	11614. HRS
COMBUSTOR CAN REPLACEMENT:	7277. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	2768. HRS
N1 TURBINE OVERHAUL:	2768. HRS
N2 TURBINE OVERHAUL:	11614. HRS

FUEL: JET - A FUEL H/C RATIO: 1.920

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 75.00 FINISH 76.00

ATMOSPHERIC PRESSURE: START 29.08 FINISH 29.08

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0140

RELATIVE HUMIDITY: 76.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 133.00, FLOW RATE, LITERS/MIN: 16.00

SAMPLE LINE TRANSPORT TIME, SEC: 0.99

NUMBER OF TESTS: 4

COMMENTS:

H/C CAL ESTIMATED
SAMPLE LINE TEMP. AVERAGED
WITHOUT RETROFIT

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
1030.00	2/ 0	9550.00	68	7300.00	11030.00	5630.00	-0.00	-0.000000	-0.00	1.63	-0.00
1035.00	1/ 2	950.00	6	2900.00	7180.00	1030.00	-0.00	-0.000000	-0.00	1.11	-0.00
1045.00	5/ 1	12700.00	90	8060.00	11530.00	7810.00	-0.00	-0.000000	-0.00	1.93	-0.00
1055.00	1/ 5	510.00	6	2850.00	707.00	1060.00	-0.00	-0.000000	-0.00	1.11	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO 2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO 2 (WET) PPMV	NO X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
68	870.00	23.19	34.20	1.80	2.60	30.00	49.00	79.00	-0.00	-0.00	-0.00
6	695.00	15.95	105.00	0.46	36.70	2.10	5.00	7.10	-0.00	-0.00	-0.00
90	1000.00	27.28	33.00	2.37	2.80	61.20	68.00	129.20	-0.00	-0.00	-0.00
6	695.00	15.95	73.00	0.34	45.90	1.60	6.00	7.60	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
68	3.81	0.17	8.96	3149.45	5.49	14.45	21.44	0.93	50.46	17731.40	30.89	81.35
6	44.48	8.90	3.48	3061.58	1.46	4.94	45.81	9.17	3.58	3153.42	1.50	5.09
90	2.79	0.14	9.45	3151.13	8.51	17.96	21.81	1.06	73.82	24610.31	66.44	140.25
6	41.67	15.00	5.63	3049.26	1.50	7.13	44.17	15.91	5.96	3232.21	1.59	7.55

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO 2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO 2 LB/1K#TH-HR	NO X LB/1K#TH-HR
68	2.245	1856.691	0.098	3.235	5.284	8.519
6	48.223	3319.394	9.653	1.584	3.772	5.356
90	1.717	1937.820	0.083	5.231	5.812	11.044
6	48.536	3551.878	17.478	1.747	6.553	8.300

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DATE:  7/ 1/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  126     ENGINE TYPE AND MODEL:  JT8D-7                    SERIAL NUMBER:     654607

                             RATED THRUST:          14000.

     ENGINE TOTAL TIME:                              9392. HRS

     TIME SINCE HOT SECTION OVERHAUL:                2876. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                    7351. HRS
          N2 COMPRESSOR OVERHAUL:                    7304. HRS
          COMBUSTOR CAN REPLACEMENT:                 2472. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                       1231. HRS
          N2 TURBINE OVERHAUL:                          0. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   56.84   FINISH   56.30

     ATMOSPHERIC PRESSURE:              START   29.91   FINISH   29.90

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0069

     RELATIVE HUMIDITY:                     69.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    1.50

     SAMPLE LINE TRANSPORT TIME, SEC:     5.00

NUMBER OF TESTS:   3

COMMENTS:

 EXHAUST GAS PRESSURE IN INCHES HG.


  CLOCK      TEST          POWER                    ENGINE           MEASURED    GAS GEN      CALC      COMPRESSOR    ENGINE     TURBINE
  TIME       MODE     THRUST,LBS  PERCENT           SPEED              FUEL     AIR FLOW      F/A      DISCHARGE    PRESSURE     INLET
                          OR       RATED             RPM               FLOW      LB/SEC                    TEMP        RATIO       TEMP
                         SHP       T.O.        N1          N2         LB/HR                             DEGREES F      EPR      DEGREES F

 2031.00     1/ 0    10774.00        76     7427.00  11025.00       6246.00      -0.00   -0.000000      -0.00        1.72        -0.00
 2037.00     2/ 1    12222.00        87     7797.00  11265.00       7175.00      -0.00   -0.000000      -0.00        1.84        -0.00
 2041.00     3/ 2    13521.00        96     8139.00  11502.00       8140.00      -0.00   -0.000000      -0.00        1.96        -0.00


  POWER    EXHAUST      EXHAUST          CO          CO        THC       NO        NO        NO    ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS          (WET)          2       (WET)     (WET)       2         X
  RATED     TEMP       PRESSURE        PPMV        (WET)       PPMV      PPMV     (WET)     (WET)
  T.O.   DEGREES F       PSIA                    PERCENT V                        PPMV      PPMV

   76      867.20       51.60          35.00        2.28       1.80     86.00    -0.00     88.00     -0.00     -0.00      -0.00
   87      912.20       55.10          20.00        2.48       1.80    111.00    -0.00    113.00     -0.00     -0.00      -0.00
   96      962.60       58.60          20.00        2.62       1.80    134.00    -0.00    137.00     -0.00     -0.00      -0.00


  POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
  RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   76        3.08       0.09      -0.00    3150.80      12.42      12.71      19.23       0.57      -0.00   19679.92      77.60      79.41
   87        1.62       0.08      -0.00    3153.12      14.75      15.02      11.61       0.60      -0.00   22623.63     105.86     107.76
   96        1.53       0.08      -0.00    3153.27      16.86      17.24      12.47       0.64      -0.00   25667.57     137.24     140.31


  POWER          CO                 CO                  THC                 NO                  NO                  NO
 PERCENT                             2                                                           2                   X
  RATED     LB/1K#TH-HR        LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR         LB/1K#TH-HR
  T.O.

   76           1.785           1826.612              0.053               7.203              -0.000               7.370
   87           0.950           1851.058              0.049               8.661              -0.000               8.817
   96           0.922           1898.349              0.048              10.150              -0.000              10.377
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DATE:   7/ 8/71

TEST ORGANIZATION:  UNITED/EPA

FNGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  131    ENGINE TYPE AND MODEL:  JT8D-7                        SERIAL NUMBER:    655021

                            RATED THRUST:        14000.

     ENGINE TOTAL TIME:                          4929. HRS

     TIME SINCE HOT SECTION OVERHAUL:               0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                9008. HRS
          N2 COMPRESSOR OVERHAUL:                3404. HRS
          COMBUSTOR CAN REPLACEMENT:                0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:   0. HRS
          N1 TURBINE OVERHAUL:                      0. HRS
          N2 TURBINE OVERHAUL:                      0. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA ***************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   54.86   FINISH   54.68

     ATMCSPHERIC PRESSURE:              START   30.01   FINISH   29.99

     INLET AIR HUMIDITY, LBS H2O/LB AIR:  -0.0000

     RELATIVE HUMIDITY:                   -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   -0.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   3

COMMENTS:

 EXHAUST GAS PRESSURE IS IN INCHES HG.


 CLOCK      TEST          POWER                  ENGINE            MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE     TURBINE
  TIME      MODE    THRUST,LBS  PERCENT           SPEED               FUEL    AIR FLOW     F/A      DISCHARGE   PRESSURE     INLET
                       OR        RATED             RPM                FLOW     LB/SEC                 TEMP        RATIO       TEMP
                       SHP       T.O.        N1           N2         LB/HR                         DEGREES F      EPR      DEGREES F

 608.00     1/ 0    10817.00       77     7366.00  11053.00       6251.00     -0.00   -0.000000      -0.00        1.73        -0.00
 613.00     2/ 1    12172.00       86     7663.00  11288.00       7111.00     -0.00   -0.000000      -0.00        1.84        -0.00
 616.00     3/ 2    13539.00       96     7961.00  11520.00       8054.00     -0.00   -0.000000      -0.00        1.96        -0.00


 POWER    EXHAUST     EXHAUST        CO        CO         THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS         GAS         (WET)       2        (WET)     (WET)       2         X
 RATED      TEMP      PRESSURE      PPMV      (WET)      PPMV      PPMV      (WET)     (WET)
  T.O.   DEGREES F      PSIA                PERCENT V                        PPMV      PPMV

   77      860.00      51.90       10.00      1.97       1.95     81.00     -0.00     86.00     -0.00      -0.00      -0.00
   86      905.00      55.20       10.00      2.22       2.10    104.00     -0.00    109.00     -0.00      -0.00      -0.00
   96      957.20      58.70       10.00      2.43       2.10    129.00     -0.00    134.00     -0.00      -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   77      1.02      0.11     -0.00    3153.98     13.56     14.39      6.37      0.71     -0.00   19715.51    84.74     89.98
   86      0.90      0.11     -0.00    3154.17     15.45     16.19      6.43      0.77     -0.00   22429.30   109.84    115.13
   96      0.83      0.10     -0.00    3154.32     17.51     18.18      6.65      0.80     -0.00   25404.87   140.99    146.45


 POWFR          CO              CO              THC              NO              NO              NO
PERCENT                          2                                                2               X
 RATED     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR
  T.O.

   77          0.589        1822.641          0.066            7.834          -0.000           8.318
   86          0.528        1842.697          0.064            9.024          -0.000           9.458
   96          0.491        1876.421          0.059           10.413          -0.000          10.817
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DATE:   7/21/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES

ENGINE DATA *******************************************************************************************************

     CAL ID NUMBER:  406    ENGINE TYPE AND MODEL:  JT8D-7                    SERIAL NUMBER:    655998

                              RATED THRUST:        14000.

     ENGINE TOTAL TIME:                              4005. HRS

     TIME SINCE HOT SECTION OVERHAUL:                4005. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                   10914. HRS
          N2 COMPRESSOR OVERHAUL:                   15004. HRS
          COMBUSTOR CAN REPLACEMENT:                    0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                          0. HRS
          N2 TURBINE OVERHAUL:                          0. HRS

     FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA **************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   68.00   FINISH   68.00

     ATMOSPHERIC PRESSURE:              START   29.88   FINISH   29.96

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0100

     RELATIVE HUMIDITY:                    63.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    5.00

     SAMPLE LINE TRANSPORT TIME, SEC:    5.00

NUMBER OF TESTS:   1

COMMENTS:

 EXHAUST GAS PRESSURE IN INCHES HG.
 ENGINE HAD OIL LEAD INTO CELL


 CLOCK      TEST           POWER                 ENGINE            MEASURED   GAS GEN     CALC     COMPRESSOR     ENGINE       TURBINE
  TIME      MODE    THRUST,LBS  PERCENT          SPEED               FUEL     AIR FLOW     F/A     DISCHARGE     PRESSURE       INLET
                        OR       RATED            RPM                FLOW      LB/SEC                TEMP          RATIO         TEMP
                       SHP       T.O.        N1          N2          LB/HR                         DEGREES F        EPR       DEGREES F

 1500.00    1/ 0    11023.00       78     7493.00  1'088.00       6431.00      -0.00   -0.000000      -0.00          1.75          -0.00


 POWER    EXHAUST     EXHAUST         CO         CO        THC       NO        NO        NO      ALDEHYDES    SMOKE   PARTICULATES
PERCENT     GAS         GAS          (WET)        2        (WET)    (WET)       2         X
 RATED     TEMP       PRESSURE       PPMV       (WET)      PPMV     PPMV      (WET)     (WET)
 T.O.   DEGREES F       PSIA                  PERCENT V                       PPMV      PPMV

  78      917.60       52.20         40.00       2.15       1.50     90.00    -0.00      98.00     -0.00      -0.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

  78        3.73      0.08     -0.00    3149.81     13.78     15.01     23.99      0.52     -0.00   20256.42     88.64     96.52


 POWER         CO                CO               THC                NO                NO                NO
PERCENT                           2                                                     2                 X
 RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

  78          2.176           1837.650            0.047             8.042            -0.000             8.757
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DATE:   7/16/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA *******************************************************************************************************

     CAL ID NUMBER:   91     ENGINE TYPE AND MODEL:  JT8D-1               SERIAL NUMBER:   649416

                             RATED THRUST:          14000.

     ENGINE TOTAL TIME:                               2160. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL:  JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA **************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    79.00   FINISH   78.00

     ATMOSPHERIC PRESSURE:              START    14.35   FINISH   14.35

     INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0105

     RELATIVE HUMIDITY:                     65.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  135.00,  FLOW RATE, LITERS/MIN:    16.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

  NUMBER OF TESTS:   4

  COMMENTS:

   H/C IS CAL-ESTIMATED
   NEW PROBE CONFIG. USED
   SAMPLE LINE TEMP. AVERAGED
   NEW PROBE CONFIGURATION USED FOR THIS RUN
  WITH RETROFIT


                               POWER                 ENGINE          MEASURED   GAS GEN     CALC    COMPRESSOR    ENGINE     TURBINE
   CLOCK      TEST       THRUST,LBS  PERCENT         SPEED             FUEL    AIR FLOW     F/A     DISCHARGE    PRESSURE     INLET
   TIME       MODE           OR       RATED           RPM              FLOW     LB/SEC                 TEMP        RATIO        TEMP
                            SHP        T.O.      N1         N2         LB/HR                        DEGREES F      EPR      DEGREES F

  1255.00     5/ 0       9400.00       67     7215.00   10980.00     5540.00     -0.00   -0.000000     -0.00        1.63       14.15
   100.00     1/ 5        990.00        7     2910.00    7200.00     1063.00     -0.00   -0.000000     -0.00        1.03       14.33
   120.00     1/ 1        970.00        6     2880.00    7130.00     1088.00     -0.00   -0.000000     -0.00        1.03       14.33
   125.00     4/ 1      10800.00       77     7510.00   11200.00     6450.00     -0.00   -0.000000     -0.00        1.74       14.15


                                                                                                 ALDEHYDES    SMOKE    PARTICULATES
   POWER     EXHAUST      EXHAUST          CO          CO        THC       NO         NC          NO
  PERCENT      GAS          GAS           (WET)          2       (WET)     (WET)         2           X
   RATED      TEMP       PRESSURE         PPMV        (WET)      PPMV      PPMV       (WET)       (WET)
   T.O.    DEGREES F       PSIA                     PERCENT V                          PPMV        PPMV

    67       900.00        32.10          19.50       2.23       1.90     69.80       9.00       78.80       0.36       -0.00       -C.00
     7       715.00        14.75         169.00       1.17      64.80      5.50       7.00       12.50       6.36       -0.00       -0.00
     6       715.00        14.75         162.00       1.15      62.60      4.10       6.00       10.10      -0.00       -0.00       -C.00
    77       945.00        24.65          19.50       2.41       3.00     43.70       8.50       52.20       0.29       -0.00       -0.00


   POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS FMI   MASS EMI   MASS EMI
  PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2         NO         NOX
   RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
   T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    67        1.75       0.10       1.33     3152.86     10.32      11.65       9.72       0.54       7.37    17466.87     57.15      64.52
     7       28.44       6.25       1.94     3094.07      1.52       3.46      30.24       6.64       2.06     3288.99      1.62       3.67
     6       27.75       6.14       1.69     3095.44      1.15       2.84      30.19       6.68       1.84     3367.83      1.26       3.09
    77        1.62       0.14       1.16     3152.95      5.98       7.14      10.47       0.92       7.50    20336.50     38.55      46.05


                                                                                                NO
   POWER          CO                CO                THC               NO               NO            X
  PERCENT                             2                                                    2       LB/1K#TH-HR
   RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
   T.O.

    67          1.034           1858.177            0.058             6.080             0.784          6.864
     7         30.541           3322.215            6.707             1.633             2.078          3.711
     6         31.128           3471.994            6.889             1.294             1.894          3.188
    77          0.970           1883.010            0.085             3.569             0.694          4.264
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DATE:   6/25/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA ******************************************************************************************

    CAL ID NUMBER:   88    ENGINE TYPE AND MODEL:  JT-8D-9                  SERIAL NUMBER:   665281

                           RATED THRUST:        14500.

    ENGINE TOTAL TIME:                               6589. HRS

    TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

    TIME SINCE:

        N1 COMPRESSOR OVERHAUL:                          0. HRS
        N2 COMPRESSOR OVERHAUL:                          0. HRS
        COMBUSTOR CAN REPLACEMENT:                       0. HRS
        FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
        N1 TURBINE OVERHAUL:                             0. HRS
        N2 TURBINE OVERHAUL:                             0. HRS

    FUEL: JET - A              FUEL H/C RATIO:   1.920

OPERATIONAL DATA *************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   90.00   FINISH   91.00

    ATMOSPHERIC PRESSURE:              START   14.35   FINISH   14.35

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0130

    RELATIVE HUMIDITY:                  42.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  109.00,  FLOW RATE, LITERS/MIN:   16.00

    SAMPLE LINE TRANSPORT TIME, SEC:    0.99

NUMBER OF TESTS:   5

COMMENTS:

 H/C IS CAL-ESTIMATED
TEMPERATURE OF SAMPLE LINE AVERAGED
WITH RETROFIT


  CLOCK      TEST          POWER               ENGINE            MEASURED    GAS GEN     CALC     COMPRESSOR    ENGINE      TURBINE
  TIME       MODE    THRUST,LBS  PERCENT        SPEED               FUEL     AIR FLOW     F/A     DISCHARGE    PRESSURE      INLET
                         OR       RATED          RPM                FLOW      LB/SEC                TEMP        RATIO        TEMP
                        SHP       T.O.       N1          N2         LB/HR                        DEGREES F       EPR      DEGREES F

 1130.00     1/ 0      920.00       6     2890.00     7210.00     1110.00     -0.00   -0.000000     -0.00        1.C5        14.38
 1135.00     2/ 1    13360.00      92     8120.00    11590.00     8300.00     -0.00   -0.000000     -0.00        1.98        14.20
 1140.00     3/ 2    11640.00      80     7723.00    11384.00     7040.00     -0.00   -0.000000     -0.00        1.84        14.20
 1145.00     4/ 3    10600.00      73     7487.00    11217.00     6340.00     -0.00   -0.000000     -0.00        1.8C        14.20
 1150.00     5/ 4    10070.00      69     7377.00    11131.00     5990.00     -0.00   -0.000000     -0.00        1.63        14.20


  POWER     EXHAUST      EXHAUST          CO          CO        THC       NO        NO          NO      ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS           (WET)          2       (WET)     (WET)       2           X
  RATED      TEMP       PRESSURE         PPMV       (WET)      PPMV      PPMV     (WET)       (WET)
  T.O.    DEGREES F      PSIA                     PERCENT V                        PPMV        PPMV

     6       -0.00       15.20          66.00        0.56     -0.00       5.50     1.50        7.00      2.76     -0.00      -0.00
    92     1040.00       28.30          20.00        3.07     -0.00     167.00     7.50      174.50      0.90     -0.00      -0.00
    80      975.00       26.30          24.00        2.82     -0.00     138.00     8.50      146.50      1.22     -0.00      -0.00
    73      935.00       25.90          27.00        2.48     -0.00     118.00     9.00      127.00      1.59     -0.00      -0.00
    69      925.00       23.30          28.00        2.45     -0.00     112.00     9.00      121.00      0.87     -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2        NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

     6      23.40     -0.00      0.87   3119.13      3.20      4.08     25.97     -0.00      0.97   3462.23      3.55      4.52
    92       1.31     -0.00      0.81   3153.83     17.93     18.74     10.85     -0.00      6.69  26176.92    148.86    155.54
    80       1.71     -0.00      0.99   3153.20     16.13     17.12     12.02     -0.00      6.99  22198.56    113.56    120.56
    73       2.18     -0.00      1.20   3152.46     15.68     16.88     13.85     -0.00      7.58  19986.57     99.41    107.00
    69       2.29     -0.00      1.21   3152.29     15.06     16.29     13.73     -0.00      7.25  18882.19     90.24     97.49


  POWER          CO               CO              THC               NO               NO               NO
 PERCENT                           2                                                  2                X
  RATED      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

     6         28.228         3763.293          -0.000            3.864            1.054            4.918
    92          0.812         1959.343          -0.000           11.142            0.500           11.643
    80          1.033         1907.093          -0.000            9.756            0.601           10.357
    73          1.306         1885.526          -0.000            9.379            0.715           10.094
    69          1.364         1875.094          -0.000            8.961            0.720            9.681
```

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DATE:   8/19/71

TEST ORGANIZATION:  PRATT & WHITNEY

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  354    ENGINE TYPE AND MODEL:  JT-8D-9                  SERIAL NUMBER:    P-666987

                            RATED THRUST:        14500.

     ENGINE TOTAL TIME:                                   -0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     -0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         -0. HRS
          N2 COMPRESSOR OVERHAUL:                         -0. HRS
          COMBUSTOR CAN REPLACEMENT:                      -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         -0. HRS
          N1 TURBINE OVERHAUL:                            -0. HRS
          N2 TURBINE OVERHAUL:                            -0. HRS

     FUEL: JP-4                 FUEL H/C RATIO:   2.000

OPERATIONAL DATA *************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   84.00   FINISH   80.00

     ATMOSPHERIC PRESSURE:              START   29.96   FINISH   29.95

     INLET AIR HUMIDITY, LBS H2O/LB AIR:  -0.0000

     RELATIVE HUMIDITY:                   -0.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:    2.00

     SAMPLE LINE TRANSPORT TIME, SEC:    1.00

NUMBER OF TESTS:   6

COMMENTS:

 EXHAUST GAS PRESSURE IN INCHES HG


 CLOCK     TEST          POWER              ENGINE           MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE      TURBINE
  TIME     MODE   THRUST,LBS  PERCENT        SPEED              FUEL    AIR FLOW     F/A     DISCHARGE    PRESSURE      INLET
                      OR       RATED          RPM               FLOW     LB/SEC                 TEMP        RATIO        TEMP
                     SHP       T.O.      N1          N2         LB/HR                        DEGREES F       FPR      DEGREES F

 1713.00   1/ 0     5040.00      34    5750.00    9880.00     2929.00     84.80   0.009590      -0.00        1.30        -0.00
 1001.00   2/ 1     9520.00      65    7160.00   10910.00     5375.00    121.00   0.012340      -0.00        1.63        -0.00
 1811.00   3/ 2    10850.00      74    7460.00   11125.00     6190.00    129.00   0.013330      -0.00        1.75        -0.00
 1822.00   4/ 3    11950.00      82    7710.00   11294.00     6860.00    136.60   0.013950      -0.00        1.85        -0.00
 1030.00   5/ 4    13750.00      94    8175.00   11590.00     8195.00    150.80   0.015090      -0.00        2.02        -0.00
 1845.00   6/ 5      840.00       5    2590.00     840.00      911.00     29.90   0.008460      -0.00        1.04        -0.00


 POWER   EXHAUST     EXHAUST        CO         CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT    GAS         GAS        (WET)         2       (WET)     (WET)       2         X
 RATED     TEMP      PRESSURE      PPMV      (WET)      PPMV      PPMV     (WET)     (WET)
  T.O.  DEGREES F      PSIA                PERCENT V                        PPMV      PPMV

   34     710.00      38.61       49.30      1.68       5.90       0.0      6.50      6.50     -0.00     -0.00     -0.00
   65     875.00      48.26       18.50      2.38       3.30      85.90     9.10     95.00     -0.00     -0.00     -0.00
   74     915.00      51.63       15.00      2.58       3.20     105.20     9.10   1143.00     -0.00     -0.00     -0.00
   82     950.00      54.32       13.20      2.69       3.50     124.10     9.10    133.20     -0.00     -0.00     -0.00
   94    1010.00      59.29       10.70      2.95       4.50     166.00     9.40    175.40     -0.00     -0.00     -0.00
    5     685.00      31.05      195.20      0.92      31.10       6.80     2.30      9.10     -0.00     -0.00     -0.00


 POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT     CO        HC       NO2       CO2        NO       NOX        CO        HC       NO2       CO2        NO       NOX
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   34      5.84      0.40      1.26   3127.47       0.0      1.26     17.11      1.17      3.71   9160.36       0.0      3.71
   65      1.55      0.16      1.25   3134.87     11.83     13.08      8.34      0.85      6.74  16849.94     63.58     70.31
   74      1.16      0.14      1.16   3135.53     13.37    145.22      7.18      0.88      7.16  19408.95     82.73    898.90
   82      0.98      0.15      1.11   3135.80     15.12     16.23      6.72      1.02      7.61  21511.56    103.75    111.35
   94      0.72      0.17      1.04   3136.13     18.45     19.49      5.93      1.43      8.56  25700.58    151.19    159.75
    5     41.35      3.77      0.80   3062.41      2.37      3.17     37.67      3.44      0.73   2789.86      2.16      2.88


 POWER        CO               CO              THC               NO               NO               NO
PERCENT                         2                                                  2                X
 RATED   LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

   34        3.395         1817.532           0.233            0.0              0.735            0.735
   65        0.876         1769.952           0.089            6.678            0.707            7.386
   74        0.662         1788.844           0.081            7.625            0.660           82.848
   82        0.562         1800.131           0.085            8.682            0.637            9.318
   94        0.431         1869.133           0.104           10.995            0.623           11.618
    5       44.849         3321.261           4.092            2.566            0.868            3.434
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DATE:  8/ 6/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINE SUPPLIER:    AMERICAN AIRLINES

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  333    ENGINE TYPE AND MODEL:  SPEY 511-14           SERIAL NUMBER:   7065

                            RATED THRUST:        11400.

     ENGINE TOTAL TIME:                                  7861. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     658. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         658. HRS
          N2 COMPRESSOR OVERHAUL:                         658. HRS
          COMBUSTOR CAN REPLACEMENT:                      658. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         658. HRS
          N1 TURBINE OVERHAUL:                            658. HRS
          N2 TURBINE OVERHAUL:                            658. HRS

     FUEL:  JET - A               FUEL H/C RATIO:    1.920

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    72.00    FINISH    72.00

     ATMOSPHERIC PRESSURE:              START    29.12    FINISH    29.12

     INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0150

     RELATIVE HUMIDITY:                        84.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  147.00,  FLOW RATE, LITERS/MIN:    16.00

     SAMPLE LINE TRANSPORT TIME, SEC:     0.99

NUMBER OF TESTS:   7

COMMENTS:

 H/C CAL ESTIMATED
 SAMPLE LINE TEMP. AVERAGED
 ENGINE RUN 380371,RETURNED TO SHOP FOR REPAIRS
 THEN TO TEST SECOND TIME
 PROBE SAME AS USED 08-02-71
 .FT. OF SAMPLE LINE NOT HEATED


  CLOCK      TEST           POWER                  ENGINE           MEASURED    GAS GEN       CALC     COMPRESSOR     ENGINE      TURBINE
  TIME       MODE     THRUST,LBS  PERCENT          SPEED              FUEL     AIR FLOW       F/A      DISCHARGE    PRESSURE      INLET
                          OR       RATED            RPM               FLOW      LB/SEC                   TEMP         RATIO       TEMP
                         SHP       T.O.        N1          N2         LB/HR                            DEGREES F       EPR      DEGREES F

   920.00    1/ 0      630.00        5     2690.00     7560.00      960.00      -0.00   -0.000000       -0.00         1.06        -0.00
   925.00    2/ 1    11340.00       99     8500.00    12420.00     7480.00      -0.00   -0.000000       -0.00         2.54        -0.00
   930.00    3/ 2    10900.00       95     8380.00    12320.00     7150.00      -0.00   -0.000000       -0.00         2.48        -0.00
   935.00    4/ 3    10300.00       90     8190.00    12150.00     6670.00      -0.00   -0.000000       -0.00         2.40        -0.00
   940.00    5/ 4     9800.00       85     8050.00    12000.00     6290.00      -0.00   -0.000000       -0.00         2.32        -0.00
   945.00    6/ 5     7500.00       65     7375.00    11550.00     4690.00      -0.00   -0.000000       -0.00         1.98        -0.00
   950.00    1/ 6      650.00        5     2700.00     7620.00       93.00      -0.00   -0.000000       -0.00         1.06        -0.00


  POWER     EXHAUST      EXHAUST          CO         CO        THC        NO        NO        NO      ALDEHYDES    SMOKE   PARTICULATES
 PERCENT      GAS          GAS           (WET)        2       (WET)     (WET)        2         X
  RATED      TEMP       PRESSURE         PPMV      (WET)      PPMV      PPMV      (WET)     (WET)
  T.O.     DEGREES F      PSIA                   PERCENT V                         PPMV      PPMV

    5        810.00       15.30          -0.00      -0.00   1050.00     -0.00     -0.00     -0.00      -0.00      -0.00      -0.00
   99       1155.00       35.98          41.00       3.08      5.00     -0.00     18.00     18.00       1.25      -0.00      -0.00
   95       1125.00       35.25          43.00       3.00      5.00     -0.00     22.00     22.00       0.66      -0.00      -0.00
   90       1100.00       34.03          44.00       2.82      4.00     -0.00     29.00     29.00       0.46      -0.00      -0.00
   85       1075.00       32.90          46.00       2.78      4.00     -0.00     36.00     36.00       0.48      -0.00      -0.00
   65        955.00       28.24          56.00       2.32      3.00     -0.00     33.00     33.00       0.44      -0.00      -0.00
    5        820.00       15.30         730.00       1.22    620.00     -0.00      6.00      6.00      76.10      -0.00      -0.00


  POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
  RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    5       -0.00     1150.35      -0.00      -0.00      -0.00      -0.00      -0.00    1104.33      -0.00      -0.00      -0.00      -0.00
   99        2.67        0.19       1.93    3151.18      -0.00       1.93      19.97       1.39      14.40   23570.84      -0.00      14.40
   95        2.87        0.19       2.42    3150.85      -0.00       2.42      20.55       1.37      17.27   22528.56      -0.00      17.27
   90        3.13        0.16       3.39    3150.53      -0.00       3.39      20.87       1.09      22.59   21014.00      -0.00      22.59
   85        3.32        0.17       4.26    3150.22      -0.00       4.26      20.87       1.04      26.82   19814.90      -0.00      26.82
   65        4.84        0.15       4.68    3147.88      -0.00       4.68      22.68       0.70      21.95   14763.57      -0.00      21.95
    5      108.21       52.64       1.46    2841.47      -0.00       1.46      10.06       4.90       0.14     264.26      -0.00       0.14


  POWER          CO                 CO                THC                 NO                 NO                 NO
 PERCENT                             2                                                          2                  X
  RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
  T.O.

    5          -0.000             -0.005           1752.911             -0.000             -0.000             -0.000
   99           1.761           2078.557              0.123             -0.000              1.270              1.270
   95           1.885           2066.840              0.126             -0.000              1.584              1.584
   90           2.026           2040.195              0.105             -0.000              2.193              2.193
   85           2.129           2021.929              0.106             -0.000              2.737              2.737
   65           3.024           1968.476              0.093             -0.000              2.927              2.927
    5          15.482            406.548              7.531             -0.000              0.209              0.209
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DATE:   7/27/71

TEST ORGANIZATION:  U.S. BUREAU OF MINES

ENGINF SUPPLIER:     AMERICAN AIRLINES

ENGINE DATA *****************************************************************************************************

     CAL ID NUMBER:  341    ENGINE TYPE AND MODEL:  SPEY 511-14                 SERIAL NUMBER:    7072

                            RATED THRUST:         11400.

     ENGINE TOTAL TIME:                            7500. HRS

     TIME SINCE HOT SECTION OVERHAUL:                 0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                  7500. HRS
          N2 COMPRESSOR OVERHAUL:                  7500. HRS
          COMBUSTOR CAN REPLACEMENT:                  0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     0. HRS
          N1 TURBINE OVERHAUL:                     7500. HRS
          N2 TURBINE OVERHAUL:                     7500. HRS

     FUEL: JET - A             FUEL H/C RATIO:   1.920
OPERATIONAL DATA ************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   79.00   FINISH   79.00

     ATMOSPHERIC PRESSURE:              START   29.20   FINISH   29.20

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0

     RELATIVE HUMIDITY:                      67.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  135.00,  FLOW RATE, LITERS/MIN:   16.00

     SAMPLE LINE TRANSPORT TIME, SEC:    0.99

 NUMBER OF TESTS:   1

 COMMENTS:

  H/C CAL ESTIMATED
  SAMPLE LINE TEMP. AVERAGED
  PROBE SUPPORT PIPE FAILED AFTER RUN
  PROBE LOCATED 33" DOWNSTREAM


                                                                                                                TURBINE
                                                           MEASURED    GAS GEN      CALC     COMPRESSOR   ENGINE    INLET
  CLOCK      TEST          POWER           ENGINE            FUEL      AIR FLOW      F/A     DISCHARGE   PRESSURE   TEMP
  TIME       MODE    THRUST,LBS  PERCENT    SPEED            FLOW       LB/SEC                  TEMP       RATIO   DEGREES F
                        OR        RATED      RPM             LB/HR                           DEGREES F      EPR
                        SHP       T.O.    N1        N2

 1020.00     4/ 0     520.00        4   2680.00   7300.00   1130.00     -0.00  -0.000000     -0.00       -0.00      -0.00


                                            CO        CO       THC      NO       NO        NO    ALDEHYDES  SMOKE  PARTICULATES
  POWER    EXHAUST     EXHAUST            (WET)        2      (WET)   (WET)       2         X
 PERCENT     GAS         GAS               PPMV     (WET)     PPMV     PPMV    (WET)     (WET)
  RATED      TEMP      PRESSURE                   PERCENT V                    PPMV      PPMV
  T.O.    DEGREES F      PSIA

    4      850.00       -0.00             820.00     1.32   1296.00     1.20     3.00      4.20     -0.00    -0.00     -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    4      107.54     97.34      0.65   2719.88      0.26      0.90    121.52    109.99      0.73   3073.47      0.29      1.02


                                                                               NO              NO
  POWER          CO              CO            THC             NO                2               X
 PERCENT                          2
  RATED     LB/1K#TH-HR     LB/1K#TH-HR    LB/1K#TH-HR    LB/1K#TH-HR    LB/1K#TH-HR    LB/1K#TH-HR
  T.O.

    4         233.683        5910.512        211.526          0.562          1.404          1.966
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DATE:   7/ 8/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  109    ENGINE TYPE AND MODEL:  J52 - P8A                 SERIAL NUMBER:     677106

                            RATED THRUST:          9300.

     ENGINE TOTAL TIME:                               474. HRS

     TIME SINCE HOT SECTION OVERHAUL:                 474. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                     474. HRS
          N2 COMPRESSOR OVERHAUL:                     474. HRS
          COMBUSTOR CAN REPLACEMENT:                   -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     474. HRS
          N1 TURBINE OVERHAUL:                        474. HRS
          N2 TURBINE OVERHAUL:                        474. HRS

     FUEL: JP-5                  FUEL H/C RATIO:   1.970

OPERATIONAL DATA *************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   83.50   FINISH   84.00

     ATMOSPHERIC PRESSURE:              START   30.18   FINISH   30.18

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0150

     RELATIVE HUMIDITY:                   59.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   88.80,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   4

COMMENTS:

H/C CAL ESTIMATED
PROBE- 3 HOLE JURY RIG


 CLOCK     TEST          POWER                 ENGINE          MEASURED   GAS GEN    CALC    COMPRESSOR    ENGINE      TURBINE
 TIME      MODE    THRUST,LBS  PERCENT         SPEED             FUEL     AIR FLOW    F/A    DISCHARGE    PRESSURE      INLET
                       OR       RATED           RPM              FLOW     LB/SEC                TEMP        RATIO        TEMP
                      SHP       T.O.      N1         N2          LB/HR                        DEGREES F      EPR       DEGREES F

  -0.00    1/ 0     480.00        5      -0.00    6898.00      700.00     -0.00     0.0          0.0        -0.00          0.0
  -0.00    2/ 1    5600.00       60      -0.00   10974.00     4220.00     -0.00     0.0          0.0         2.04          0.0
  -0.00    3/ 2    7570.00       81      -0.00   11569.00     5850.00     -0.00     0.0          0.0         2.41          0.0
  -0.00    4/ 3    8230.00       88      -0.00   11774.00     6490.00     -0.00     0.0          0.0         2.55          0.0


 POWER    EXHAUST      EXHAUST         CO        CO       THC       NO        NO         NO      ALDEHYDES   SMOKE   PARTICULATES
PERCENT     GAS          GAS          (DRY)       2       (DRY)    (DRY)       2          X
 RATED      TEMP       PRESSURE       PPMV     (DRY)      PPMV     PPMV     (DRY)      (DRY)
 T.O.    DEGREES F       PSIA                PERCENT V                       PPMV       PPMV

   5      500.00        -0.00        410.00      1.18    309.00     9.90     5.00      14.90      9.00      -0.00     -0.00
  60      880.00        -0.00         24.00      2.30     15.00    50.00     8.00      58.00      1.00      -0.00     -0.00
  81     1040.00        42.60         19.00      2.67      2.00    80.00     7.50      87.50      3.00      -0.00     -0.00
  88     1100.00        46.70         24.00      2.95      1.40    90.00     6.00      56.00      2.00      -0.00     -0.00


 POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
PERCENT      CO         HC         NO2        CO2         NO        NOX         CO         HC         NO2        CO2         NO        NOX
 RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
 T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

   5       65.54      28.29       1.31    2963.93       2.60       3.91      45.88      19.80       0.92    2074.75       1.92       2.74
  60        2.08       0.75       1.14    3139.20       7.13       8.28       8.80       3.15       4.82   13247.43      30.11      34.92
  81        1.42       0.09       0.92    3142.05       9.84      10.76       8.32       0.50       5.40   18381.00      57.57      62.97
  88        1.63       0.05       0.67    3141.82      10.02      10.69      10.56       0.35       4.34   20390.40      65.03      69.37


 POWER         CO              CO              THC              NO              NO              NO
PERCENT                         2                                                2               X
 RATED    LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR
 T.O.

   5          95.585        4322.395          41.258           3.791           1.915           5.706
  60           1.571        2365.613           0.562           5.376           0.860           6.236
  81           1.100        2428.138           0.066           7.606           0.713           8.319
  88           1.283        2477.571           0.043           7.902           0.527           8.429
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DATE:   7/28/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS

ENGINE DATA ******************************************************************************************************

     CAL ID NUMBER:  157    ENGINE TYPE AND MODEL:  J52 - P8A                SERIAL NUMBER:     636689

                             RATED THRUST:          9300.

     ENGINE TOTAL TIME:                             1310. HRS

     TIME SINCE HOT SECTION OVERHAUL:                328. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                    328. HRS
          N2 COMPRESSOR OVERHAUL:                    328. HRS
          COMBUSTOR CAN REPLACEMENT:                  -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     -0. HRS
          N1 TURBINE OVERHAUL:                       328. HRS
          N2 TURBINE OVERHAUL:                       328. HRS

     FUEL: JP-5                 FUEL H/C RATIO:   1.970

OPERATIONAL DATA *************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   78.50   FINISH   82.00

     ATMOSPHERIC PRESSURE:              START   30.06   FINISH   30.06

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0177

     RELATIVE HUMIDITY:                    77.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  126.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   4

COMMENTS:

H/C CAL ESTIMATED


 CLOCK      TEST           POWER                  ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE     TURBINE
 TIME       MODE      THRUST,LBS  PERCENT          SPEED              FUEL     AIR FLOW      F/A      DISCHARGE     PRESSURE     INLET
                          OR       RATED            RPM               FLOW      LB/SEC                   TEMP         RATIO       TEMP
                          SHP      T.O.       N1          N2          LB/HR                            DEGREES F      EPR      DEGREES F

  -0.00     1/ 0       490.00        5      -0.00   6742.00       750.00      -0.00   -0.000000        -0.00        -0.00        -0.00
  -0.00     2/ 1      5200.00       55      -0.00   1073.00      3970.00      -0.00   -0.000000        -0.00         1.89        -0.00
  -0.00     3/ 2      6900.00       74      -0.00  11202.00      5315.00      -0.00   -0.000000        -0.00         2.21        -0.00
  -0.00     4/ 3      8040.00       86      -0.00  11582.00      6340.00      -0.00   -0.000000        -0.00         2.43        -0.00


  POWER    EXHAUST      EXHAUST          CO          CO        THC        NO         NO         NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS          (DRY)          2       (DRY)     (DRY)        2          X
  RATED     TEMP.      PRESSURE        PPMV        (DRY)      PPMV      PPMV      (DRY)      (DRY)
  T.O.    DEGREES F      PSIA                    PERCENT V                         PPMV       PPMV

    5      520.00        -0.00        605.00       1.28     221.00     83.00      1.90      84.90       2.40     -0.00      -C.C0
   55      845.00        26.30         90.00       2.29       4.00    116.00      2.00     118.00       0.40     -0.00      -0.00
   74      983.00        35.90         57.00       3.21       1.00    133.00      2.00     135.00       0.50     -0.00      -C.00
   86     1085.00        42.10         34.00       3.52       0.50    154.00      2.00     156.0C       0.30     -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO       NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    5       88.86     18.59      0.46   2953.91     20.02     20.48     66.64     13.94      0.34   2215.43     15.02     15.36
   55        7.83      0.20      0.29   3131.67     16.58     16.87     31.10      0.79      1.14  12432.73     65.84     66.97
   74        3.55      0.04      0.20   3136.85     13.60     13.80     18.85      0.19      1.09  16683.00     72.26     73.35
   86        1.93      0.02      0.19   3141.45     14.37     14.55     12.24      0.10      1.18  19916.77     91.09     92.27


  POWER          CO                CO                THC               NO                NO               NO
 PERCENT                            2                                                     2                X
  RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

    5         136.010          4521.281            28.455            30.649            0.702           31.350
   55           5.980          2390.909             0.152            12.661            0.218           12.979
   74           2.732          2417.826             0.027            10.473            0.157           10.630
   86           1.523          2477.210             0.013            11.330            0.147           11.477
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DATE:   7/28/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  158    ENGINE TYPE AND MODEL:  J52 - P8A               SERIAL NUMBER:    661138

                            RATED THRUST:         9300.

     ENGINE TOTAL TIME:                             884. HRS

     TIME SINCE HOT SECTION OVERHAUL:               511. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                   780. HRS
          N2 COMPRESSOR OVERHAUL:                   648. HRS
          COMBUSTOR CAN REPLACEMENT:                 -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    -0. HRS
          N1 TURBINE OVERHAUL:                      511. HRS
          N2 TURBINE OVERHAUL:                      511. HRS

     FUEL: JP-5                FUEL H/C RATIO:   1.970

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   82.00   FINISH   84.00

     ATMOSPHERIC PRESSURE:              START   30.01   FINISH   30.01

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0189

     RELATIVE HUMIDITY:                    77.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  121.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   4

COMMENTS:

H/C CAL ESTIMATED


  CLOCK       TEST            POWER                   ENGINE             MEASURED    GAS GEN       CALC      COMPRESSOR      ENGINE        TURBINE
  TIME        MODE     THRUST,LBS  PERCENT             SPEED                FUEL     AIR FLOW       F/A      DISCHARGE      PRESSURE        INLET
                           OR       RATED               RPM                 FLOW      LB/SEC                    TEMP         RATIO          TEMP
                          SHP       T.O.          N1           N2           LB/HR                             DEGREES F       EPR        DEGREES F

   -0.00      1/ 0      7560.00      81         -0.00   11609.00         5860.00     -0.00     -0.000000        -0.00         -0.00         -0.00
   -0.00      2/ 1      5920.00      63         -0.00   11160.00         4470.00     -0.00     -0.000000        -0.00         -0.00         -0.00
   -0.00      3/ 2       500.00       5         -0.00    6900.00          710.00     -0.00     -0.000000        -0.00         -0.00         -0.00
   -0.00      4/ 3      8420.00      90         -0.00   11892.00         6670.00     -0.00     -0.000000        -0.00         -0.00         -0.00


  POWER     EXHAUST       EXHAUST          CO          CO         THC        NO         NO          NO      ALDEHYDES    SMOKE    PARTICULATES
 PERCENT      GAS           GAS          (DRY)          2        (DRY)     (DRY)         2           X
  RATED      TEMP         PRESSURE        PPMV        (DRY)       PPMV      PPMV       (DRY)       (DRY)
  T.O.     DEGREES F        PSIA                    PERCENT V                          PPMV        PPMV

   81       1055.00         41.60        365.00        1.21       70.00      8.00       2.00       10.00        3.40      -0.00        -0.00
   63        915.00         31.90         59.00        2.53        2.00     40.00       3.00       43.00        0.10      -0.00        -0.00
    5        510.00         -0.00         33.00        2.86        0.50     53.00       3.00       56.00        0.05      -0.00        -0.00
   90       1148.00         46.70         32.00        3.14        0.49     78.00       2.00       80.00        0.40      -0.00        -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   81        58.28      6.40      0.52   3035.40      2.10      2.62    341.49     37.51      3.07  17787.45     12.29     15.37
   63         4.66      0.09      0.39   3136.96      5.18      5.57     20.81      0.40      1.74  14022.21     23.18     24.91
    5         2.31      0.02      0.34   3140.85      6.08      6.43      1.64      0.01      0.24   2230.00      4.32      4.56
   90         2.04      0.02      0.21   3141.27      8.16      8.37     13.59      0.12      1.40  20952.30     54.41     55.81


  POWER          CO               CO                 THC                NO                 NO                NO
 PERCENT                           2                                                        2                 X
  RATED     LB/1K#TH-HR      LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR       LB/1K#TH-HR
  T.O.

   81          45.171         2352.837             4.961              1.626              0.407             2.033
   63           3.516         2368.618             0.068              3.915              0.294             4.208
    5           3.275         4460.000             0.028              8.640              0.489             9.129
   90           1.614         2488.397             0.014              6.462              0.166             6.628
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DATE:   7/ 8/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS

ENGINE DATA ******************************************************************************************

     CAL ID NUMBER:   98    ENGINE TYPE AND MODEL:  J52 - P8B                  SERIAL NUMBER:    677316

                            RATED THRUST:          8500.

     ENGINE TOTAL TIME:                                   310. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     310. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         310. HRS
          N2 COMPRESSOR OVERHAUL:                         310. HRS
          COMBUSTOR CAN REPLACEMENT:                        0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         310. HRS
          N1 TURBINE OVERHAUL:                            310. HRS
          N2 TURBINE OVERHAUL:                            310. HRS

     FUEL: JP-5                 FUEL H/C RATIO:   1.970

OPERATIONAL DATA *************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   86.00   FINISH   85.[illegible]

     ATMOSPHERIC PRESSURE:              START   30.14   FINISH   30.14

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0120

     RELATIVE HUMIDITY:                   46.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   93.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   8

COMMENTS:

H/C CAL ESTIMATED
SMOKELESS COMBUSTOR CAN


  CLOCK     TEST          POWER                   ENGINE            MEASURED   GAS GEN      CALC     COMPRESSOR    ENGINE     TURBINE
  TIME      MODE    THRUST,LBS  PERCENT            SPEED               FUEL    AIR FLOW      F/A     DISCHARGE    PRESSURE     INLET
                        OR       RATED              RPM                FLOW    LB/SEC                  TEMP        RATIO       TEMP
                       SHP       T.O.         N1          N2          LB/HR                          DEGREES F      EPR      DEGREES F

  -0.00     5/ 0     470.00        5        -0.00    6870.00        685.00     -0.00   -0.000000      -0.00       -0.00       -0.00
  -0.00     6/ 5     480.00        5        -0.00    6910.00        700.00     -0.00   -0.000000      -0.00       -0.00       -0.00
  -0.00     1/ 6      -0.00        0        -0.00      -0.00         -0.00     -0.00   -0.000000      -0.00       -0.0C       -0.00
  -0.00     2/ 1    5360.00       63        -0.00   10958.00       4050.00     -0.00   -0.000000      -0.00        1.98       -0.00
  -0.00     7/ 2    7210.00       84        -0.00   11565.00       5515.00     -0.00   -0.000000      -0.00       -0.00       -0.00
  -0.00     8/ 7    7240.00       85        -0.00   11570.00       5550.00     -0.00   -0.000000      -0.00       -0.00       -0.00
  -0.00     9/ 8    7240.00       85        -0.00   11569.00       5540.00     -0.00   -0.000000      -0.00       -0.00       -0.00
  -0.00    10/ 9    8225.00       96        -0.00   11890.00       6455.00     -0.00   -0.000000      -0.00       -0.00       -0.00


  POWER    EXHAUST     EXHAUST          CO        CO         THC       NO        NO         NO      ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS         GAS           (DRY)       2        (DRY)     (DRY)       2          X
  RATED     TEMP       PRESSURE        PPMV      (DRY)      PPMV      PPMV      (DRY)      (DRY)
  T.O.   DEGREES F       PSIA                  PERCENT V                        PPMV       PPMV

    5      500.00        -0.00        340.00      1.04     225.00      5.00      7.00      49.00       7.40     -0.00      -0.00
    5      500.00        -0.00        340.00      0.85     225.00      5.00      8.00       4.90      -0.00     -0.00      -0.00
    0       -0.00        -0.00        330.00      1.07     262.00     10.00      8.00       4.90       3.00     -0.00      -0.00
   63      865.00        29.00         32.00      2.20      23.00     55.00     11.00      57.00      -0.00     -0.00      -0.00
   84     1009.00        40.20         23.00      2.58      -0.00     85.00     10.00      80.00       0.10     -0.00      -0.00
   85     1015.00        40.40         22.00      2.58      -0.00     80.00     10.00      78.00      -0.00     -0.00      -0.00
   85     1010.00        40.40         21.00      2.58       5.00     75.00     11.00      78.00      -0.00     -0.00      -0.00
   96     1120.00        46.20         20.00      2.78       4.00     90.00     10.00      90.00       0.10     -0.00      -0.00


  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K    LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    5      62.06     23.52      2.10   2982.50      1.50     14.69     42.51     16.11      1.44   2043.01      1.03     10.06
    5      75.06     28.45      2.90   2948.53      1.81      1.78     52.54     19.91      2.03   2063.97      1.27      1.24
    0      58.49     26.59      2.33   2979.67      2.91      1.43     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00
   63       2.90      1.20      1.64   3136.68      8.20      8.50     11.76      4.84      6.64  12703.56     33.20     34.41
   84       1.78     -0.00      1.27   3141.72     10.82     10.18      9.83     -0.00      7.02  17326.60     59.68     56.16
   85       1.71     -0.00      1.27   3141.85     10.18      9.93      9.46     -0.00      7.07  17437.24     56.52     55.11
   85       1.63      0.22      1.40   3141.36      9.55      9.93      9.02      1.23      7.76  17403.13     52.89     55.00
   96       1.44      0.16      1.18   3141.81     10.63     10.63      9.29      1.06      7.63  20280.39     68.64     68.64


  POWER         CO               CO                THC               NO                NO                NO
 PERCENT                          2                                                    2                 X
  RATED    LB/1K#TH-HR      LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
  T.O.

    5        90.444          4346.828            34.279             2.185             3.059            21.410
    5       109.467          4299.941            41.489             2.644             4.231             2.591
***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
   63         2.194          2370.067             0.903             6.194             1.239             6.419
   84         1.363          2403.134            -0.000             8.277             0.974             7.790
   85         1.307          2408.459            -0.000             7.807             0.976             7.612
   85         1.245          2403.747             0.170             7.305             1.071             7.597
   96         1.129          2465.701             0.129             8.345             0.927             8.345
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DATE:  7/12/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:     NORFOLK NAS

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  100     ENGINE TYPE AND MODEL:  J57 - P10                     SERIAL NUMBER:     628305

                             RATED THRUST:            10500.

     ENGINE TOTAL TIME:
                                                       3395. HRS
     TIME SINCE HOT SECTION OVERHAUL:
                                                       1074. HRS
     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      1074. HRS
          N2 COMPRESSOR OVERHAUL:                      1074. HRS
          COMBUSTOR CAN REPLACEMENT:                   1074. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      1074. HRS
          N1 TURBINE OVERHAUL:                         1074. HRS
          N2 TURBINE OVERHAUL:                         1074. HRS

     FUEL: JP-5               FUEL H/C RATIO:   1.970
OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START    73.50   FINISH   76.00

     ATMOSPHERIC PRESSURE:              START    30.03   FINISH   30.06

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0134

     RELATIVE HUMIDITY:                       75.00 PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  115.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:    -0.00

NUMBER OF TESTS:   8

COMMENTS:

H/C CAL ESTIMATED


 CLOCK      TEST                                       ENGINE                                                                             
  TIME      MODE        POWER                          SPEED         MEASURED   GAS GEN      CALC    COMPRESSOR      ENGINE     TURBINE
                    THRUST,LBS  PERCENT                 RPM            FUEL    AIR FLOW      F/A      DISCHARGE     PRESSURE     INLET
                        OR       RATED                                 FLOW     LB/SEC                  TEMP          RATIO       TEMP
                       SHP       T.O.          N1         N2           LB/HR                         DEGREES F        EPR      DEGREES F
  -0.00      1/ 0      -0.00        0        -0.00      -0.00          -0.00     -0.00    -0.000000      -0.00        -0.00       -0.00
  -0.00     11/ 1      540.00       5      2185.00    5912.00        1100.00     -0.00    -0.000000      -0.00        -0.00       -0.00
  -0.00     12/11      510.00       4      2160.00    5874.00        1080.00     -0.00    -0.000000      -0.00        -0.00       -0.00
  -0.00     13/12     6320.00      60      5445.00    8748.00        5300.00     -0.00    -0.000000      -0.00        -0.00       -0.00
  -0.00     14/13      -0.00        0      5780.00    9050.00        6900.00     -0.00    -0.000000      -0.00         1.89       -0.00
  -0.00     15/14     9540.00      90      5935.00    9228.00        7770.00     -0.00    -0.000000      -0.00         2.20       -0.00
  -0.00     10/15     9450.00      89      5935.00    9230.00        7770.00     -0.00    -0.000000      -0.00         2.37       -0.00
  -0.00     16/10     9420.00      89      5930.00    9240.00        7700.00     -0.00    -0.000000      -0.00        -0.00       -0.00
                                                                                                         -0.00        -0.00       -0.00

 POWER     EXHAUST     EXHAUST        CO          CO         THC        NO         NO          NO      ALDEHYDES    SMOKE   PARTICULATES
PERCENT      GAS         GAS        (DRY)          2        (DRY)     (DRY)        2           X
 RATED      TEMP      PRESSURE      PPMV        (DRY)       PPMV      PPMV       (DRY)       (DRY)
 T.O.    DEGREES F      PSIA                  PERCENT V                           PPMV        PPMV

   0        -0.00       -0.00       675.00       1.36     1220.00      5.00       5.00       10.00      -0.00      -0.00      -0.00
   5       543.00       -0.00       645.00       1.29     1080.00      4.90       3.00        4.90       9.10      -0.00      -0.00
   4       543.00       -0.00       645.00       1.31     1150.00      4.90       3.00        4.90      -0.00      -0.00      -0.00
  60       910.00       26.50        42.00       2.22       -0.00     40.00       4.00       36.00       1.30      -0.00      -0.00
   0      1040.00       35.70        34.00       2.60       -0.00     60.00       6.00       56.00       1.20      -0.00      -0.00
  90      1085.00       40.90        30.00       2.73       -0.00     67.00       5.00       65.00       0.80      -0.00      -0.00
  89      1085.00       40.80        29.00       2.67       -0.00     64.00       4.00       64.00      -0.00      -0.00      -0.00
  89      1070.00       40.70        31.00       2.72       -0.00     63.00       3.00       64.00      -0.00      -0.00      -0.00

 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0       87.18     90.25      1.06   2759.96      1.06      2.12
   5       88.26     84.64      0.67   2773.63      1.10      1.10     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00
   4       86.66     88.50      0.66   2765.58      1.08      1.08     97.09     93.11      0.74   3051.00      1.21      1.21
  60        3.78     -0.00      0.59   3138.59      5.91      5.32     93.60     95.57      0.72   2986.83      1.17      1.17
   0        2.61     -0.00      0.76   3140.42      7.58      7.07     20.03     -0.00      3.13  16634.50     31.33     28.20
  90        2.20     -0.00      0.60   3141.07      8.06      7.82     18.03     -0.00      5.23  21668.87     52.28     48.79
  89        2.17     -0.00      0.49   3141.11      7.87      7.87     17.07     -0.00      4.67  24406.13     62.62     60.75
  89        2.28     -0.00      0.36   3140.94      7.61      7.73     16.87     -0.00      3.82  24406.45     61.16     61.16
                                                                      17.54     -0.00      2.79  24185.26     58.56     59.49

 POWER          CO                 CO                THC               NO                NO                NO
PERCENT                             2                                                      2                 X
 RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
   5          179.796          5649.992         172.421
   4          183.523          5856.520         187.402             2.244             1.374             2.244
  60            3.169          2632.042          -0.000             2.290             1.402             2.290
***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***               4.958             0.496             4.462
  90            1.789          2558.295          -0.000
  89            1.785          2582.693          -0.000             6.564             0.490             6.368
  89            1.862          2567.438          -0.000             6.472             0.404             6.472
                                                                    6.217             0.296             6.315
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DATE:   7/15/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS

ENGINE DATA ****************************************************************************************************

     CAL ID NUMBER:  103    ENGINE TYPE AND MODEL:  J57 - P10                    SERIAL NUMBER:    628115

                            RATED THRUST:        10500.

     ENGINE TOTAL TIME:                                  337. HRS

     TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                         0. HRS
          N2 COMPRESSOR OVERHAUL:                         0. HRS
          COMBUSTOR CAN REPLACEMENT:                      0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
          N1 TURBINE OVERHAUL:                            0. HRS
          N2 TURBINE OVERHAUL:                            0. HRS

     FUEL: JP-5                  FUEL H/C RATIO:   1.970

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   83.00   FINISH   83.50

     ATMOSPHERIC PRESSURE:              START   29.85   FINISH   29.86

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0114

     RELATIVE HUMIDITY:                      4.70  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   98.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   4

COMMENTS:

H/C CAL ESTIMATED


                                                                                                                   TURBINE
                                                                                         COMPRESSOR    ENGINE       INLET
                                 POWER              ENGINE        MEASURED   GAS GEN      CALC    DISCHARGE    PRESSURE      TEMP
CLOCK      TEST                                     SPEED          FUEL     AIR FLOW      F/A        TEMP        RATIO     DEGREES F
TIME       MODE     THRUST,LBS  PERCENT              RPM           FLOW      LB/SEC                DEGREES F     EPR
                        OR       RATED                             LB/HR
                       SHP       T.O.        N1         N2

 -0.00     1/ 0       -0.00        0        -0.00    5957.00      -0.00     -0.00   -0.000000      -0.00       -0.0C        -0.00
 -0.00     2/ 1     6076.00       57      5465.00    8915.00    5130.00     -0.00   -0.000000      -0.00        1.79        -0.00
 -0.00     3/ 2     8063.00       76      5800.00    9215.00    6630.00     -0.00   -0.000000      -0.00        2.09        -0.00
 -0.00     4/ 3       -0.00        0        -0.00    9401.00      -0.00     -0.00   -0.000000      -0.00       -0.00        -0.00


                                                                     THC           NO           NO           NO     ALDEHYDES   SMOKE   PARTICULATES
 POWER     EXHAUST      EXHAUST          CO           CO        (DR[illegible]  [illegible]RY)      2            X
PERCENT      GAS          GAS          (DRY)           2         [illegible]     [illegible]MV     (DRY)        (DRY)
 RATED       TEMP       PRESSURE        PPMV        (DRY)                                PPMV         PPMV
 T.O.     DEGREES F       PSIA                     PERCENT V

   0        -0.00        -0.00        582.00        1.00     5[illegible]       11.00         2.00         7.00      8.90     -0.00      -0.00
  57       940.00        23.40         53.00        2.10     [illegible]        38.00         7.00        39.00      1.00     -0.00      -0.00
  76      1050.00        32.30         34.00        2.46      2.00        68.00         4.00        61.00      0.30     -0.00      -0.00
   0        -0.00        -0.00         35.00        2.64      2.00        79.00         4.00        81.00      2.00     -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0      104.32     59.85      0.59   2816.41      3.24      2.06     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00
  57        5.04      0.38      1.09   3135.57      5.93      6.09     25.84      1.95      5.61  16085.45     30.43     31.23
  76        2.76      0.09      0.53   3139.93      9.07      8.14     18.31      0.62      3.54  20817.73     60.16     53.96
   0        2.65      0.09      0.50   3140.12      9.82     10.07     -C.00     -0.00     -0.00     -0.00     -0.00     -0.00


                                                                                        NO                  NO
 POWER           CO                CO              THC               NO                  2                   X
PERCENT                             2
 RATED      LB/1K#TH-HR      LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR        LB/1K#TH-HR         LB/1K#TH-HR
 T.O.

***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
  57           4.252          2647.375            0.322            5.008              0.923               5.140
  76           2.271          2581.885            0.077            7.461              0.439               6.693
***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS

ENGINE DATA ****************************************************************************************************

    CAL ID NUMBER:  105     ENGINE TYPE AND MODEL:  J57 - P10                 SERIAL NUMBER:    P606907

                            RATED THRUST:          10500.

    ENGINE TOTAL TIME:                             3415. HRS

    TIME SINCE HOT SECTION OVERHAUL:                586. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                    586. HRS
         N2 COMPRESSOR OVERHAUL:                    586. HRS
         COMBUSTOR CAN REPLACEMENT:                  -0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:     -0. HRS
         N1 TURBINE OVERHAUL:                       586. HRS
         N2 TURBINE OVERHAUL:                       586. HRS

    FUEL: JP-5                  FUEL H/C RATIO:   1.970

OPERATIONAL DATA ***********************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   84.00    FINISH   84.50

    ATMOSPHERIC PRESSURE:              START   29.87    FINISH   29.87

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0167

    RELATIVE HUMIDITY:                   67.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  110.00,  FLOW RATE, LITERS/MIN:   -0.00

    SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   4

COMMENTS:

H/C CAL ESTIMATED


  CLOCK      TEST            POWER                  ENGINE            MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE       TURBINE
  TIME       MODE     THRUST,LBS  PERCENT           SPEED               FUEL     AIR FLOW     F/A      DISCHARGE     PRESSURE       INLET
                          OR       RATED             RPM                FLOW      LB/SEC                  TEMP         RATIO         TEMP
                         SHP       T.O.        N1           N2         LB/HR                           DEGREES F       EPR       DEGREES F

   -0.00    11/ 0       430.00        4     2150.00      5900.00     1060.00      -0.00   -0.000000       -0.00        -0.00         -0.00
   -0.00    13/11      6080.00       57     5500.00      8921.00     5030.00      -0.00   -0.000000       -0.00         1.81         -0.00
   -0.00    14/13      7940.00       75     5820.00      9218.00     6450.00      -0.00   -0.000000       -0.00         2.10         -0.00
   -0.00    15/14      9420.00       89     6060.00      9455.00     7680.00      -0.00   -0.000000       -0.00         2.32         -0.00


  POWER     EXHAUST      EXHAUST        CO        CO        THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 PERCENT      GAS          GAS        (DRY)        2       (DRY)    (DRY)        2         X
  RATED      TEMP       PRESSURE      PPMV      (DRY)      PPMV      PPMV     (DRY)     (DRY)
  T.O.     DEGREES F      PSIA               PERCENT V                        PPMV      PPMV

    4        573.00       -0.00      590.00      1.14   1140.00      7.00      2.90      7.00      18.90     -0.00      -0.00
   57        885.00       24.00       36.00      2.09      4.65     30.00      3.00     36.00       1.50     -0.00      -0.00
   75        990.00       32.40       27.00      2.44      2.00     43.00      3.00     56.00       1.10     -0.00      -0.00
   89       1075.00       39.00       20.00      2.80      2.00     67.00      3.00     75.00       0.20     -0.00      -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2        NO       NOX        CO        HC        NO2       CO2        NO       NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    4        89.93     99.52      0.73   2730.21      1.75      1.75     95.33    105.49      0.77   2894.02      1.86      1.86
   57         3.44      0.25      0.47   3138.42      4.71      5.65     17.31      1.28      2.37  15786.26     23.69     28.43
   75         2.21      0.09      0.40   3140.79      5.79      7.54     14.27      0.61      2.60  20258.10     37.32     48.60
   89         1.43      0.08      0.35   3142.06      7.86      8.80     10.97      0.63      2.70  24130.99     60.36     67.57


  POWER          CO               CO               THC               NO               NO               NO
 PERCENT                           2                                                   2                X
  RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

    4          221.688         6730.273          245.324            4.320            1.790            4.320
   57            2.846         2596.424            0.211            3.896            0.390            4.675
   75            1.797         2551.398            0.076            4.700            0.328            6.122
   89            1.165         2561.676            0.067            6.408            0.287            7.173
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DATE:   7/ 6/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:  108    ENGINE TYPE AND MODEL:  J57 - P10                 SERIAL NUMBER:    P631861

                            RATED THRUST:          10500.

     ENGINE TOTAL TIME:                              3509. HRS

     TIME SINCE HOT SECTION OVERHAUL:                   0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                       0. HRS
          N2 COMPRESSOR OVERHAUL:                       0. HRS
          COMBUSTOR CAN REPLACEMENT:                    0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       0. HRS
          N1 TURBINE OVERHAUL:                          0. HRS
          N2 TURBINE OVERHAUL:                          0. HRS

     FUEL: JP-5                  FUEL H/C RATIO:   1.970

OPERATIONAL DATA ***********************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   78.00   FINISH   78.00

     ATMOSPHERIC PRESSURE:              START   29.84   FINISH   29.85

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0195

     RELATIVE HUMIDITY:                 92.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   98.80,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   4

COMMENTS:

H/C CAL ESTIMATED
PROBE- 3 HOLE JURY RIG


  CLOCK      TEST            POWER                   ENGINE              MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE      TURBINE
   TIME      MODE      THRUST,LBS  PERCENT            SPEED                FUEL      AIR FLOW      F/A     DISCHARGE     PRESSURE      INLET
                          OR        RATED              RPM                 FLOW      LB/SEC                   TEMP        RATIO        TEMP
                          SHP       T.O.         N1           N2          LB/HR                           DEGREES F      EPR       DEGREES F

   -0.00     1/ 0       420.00        3       2140.00      5897.00      1100.00      -0.00   -0.000000      -0.00        -0.00        -0.00
   -0.00     2/ 1      6334.00       60       5420.00      8893.00      5187.00      -0.00   -0.000000      -0.00         1.84        -0.00
   -0.00     3/ 2      7916.00       75       5780.00      9147.00      6390.00      -0.00   -0.000000      -0.00         2.06        -0.00
   -0.00     4/ 3      9675.00       92       6020.00      9405.00      7770.00      -0.00   -0.000000      -0.00         2.35        -0.00


  POWER     EXHAUST      EXHAUST          CO          CO        THC        NO         NO         NO       ALDEHYDES    SMOKE    PARTICULATES
 PERCENT      GAS          GAS          (DRY)          2       (DRY)     (DRY)        2          X
  RATED      TEMP       PRESSURE        PPMV        (DRY)      PPMV      PPMV       (DRY)      (DRY)
  T.O.     DEGREES F      PSIA                    PERCENT V                          PPMV       PPMV

    3        573.00       -0.00        665.00       1.24    1340.00     10.00       5.00      15.00        2.00      -0.00       -0.00
   60        890.00       25.00         50.00       1.96      33.00     20.00      12.50      32.50        1.00      -0.00       -0.00
   75        980.00       32.00         30.00       2.25      28.00     33.00      10.00      43.00        0.30      -0.00       -0.00
   92       1080.00       39.90         24.00       2.55      26.20     52.00      10.00      62.00        0.10      -0.00       -0.00


  POWER    MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI   MASS EMI
 PERCENT      CO         HC         NO2        CO2        NO         NOX        CO         HC         NO2        CO2        NO         NOX
  RATED     LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/1K      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR      LB/HR
  T.O.     LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL    LB FUEL

    3        92.39     106.62       1.14    2706.85       2.28       3.42     101.63     117.29       1.26    2977.53       2.51       3.77
   60         5.08       1.92       2.09    3131.27       3.34       5.43      26.37       9.97      10.83   16241.87      17.33      28.15
   75         2.66       1.42       1.46    3136.44       4.81       6.27      17.01       9.09       9.31   20041.84      30.73      40.04
   92         1.88       1.18       1.29    3138.35       6.69       7.98      14.61       9.13      10.00   24384.96      51.98      61.98


  POWER          CO                 CO                THC                 NO                 NO                 NO
 PERCENT                             2                                                        2                  X
  RATED     LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR        LB/1K#TH-HR
  T.O.

    3          241.974           7089.355            279.253              5.577              2.988              8.965
   60            4.163           2564.237              1.574              2.735              1.710              4.445
   75            2.148           2531.814              1.148              3.882              1.176              5.058
   92            1.510           2520.409              0.944              5.373              1.033              6.406
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DATE:   7/20/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS

ENGINE DATA ***************************************************************************************************************

     CAL ID NUMBER:  144    ENGINE TYPE AND MODEL:  J57 - P10               SERIAL NUMBER:    P626995

                            RATED THRUST:        10500.

     ENGINE TOTAL TIME:                              5141. HRS

     TIME SINCE HOT SECTION OVERHAUL:                  0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      0. HRS
          N2 COMPRESSOR OVERHAUL:                      0. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
          N1 TURBINE OVERHAUL:                         0. HRS
          N2 TURBINE OVERHAUL:                         0. HRS

     FUEL: JP-5               FUEL H/C RATIO:   1.970

OPERATIONAL DATA **********************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   79.00   FINISH   76.00

     ATMOSPHERIC PRESSURE:              START   29.96   FINISH   29.98

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0154

     RELATIVE HUMIDITY:                    77.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  115.50,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   4

COMMENTS:

ALL H/C CAL ESTIMATED


 CLOCK      TEST            POWER                  ENGINE              MEASURED    GAS GEN      CALC     COMPRESSOR      ENGINE       TURBINE
 TIME       MODE     THRUST,LBS  PERCENT            SPEED                FUEL      AIR FLOW     F/A       DISCHARGE     PRESSURE       INLET
                         OR       RATED              RPM                 FLOW       LB/SEC                  TEMP          RATIO         TEMP
                        SHP       T.O.        N1            N2          LB/HR                            DEGREES F        EPR        DEGREES F

 -0.00      1/ 0      -0.00        0       -0.00         -0.00          -0.00      -0.00    -0.000000      -0.00         -0.00         -0.00
 -0.00      2/ 1     6430.00      61     5535.00       8928.00        5120.00      -0.00    -0.000000      -0.00          1.84         -0.00
 -0.00      3/ 2     8218.00      78     5800.00       9218.00        6510.00      -0.00    -0.000000      -0.00          2.12         -0.00
 -0.00      4/ 3     9530.00      90     6000.00       9415.00        7560.00      -0.00    -0.000000      -0.00          2.13         -0.00


 POWER     EXHAUST       EXHAUST          CO          CO        THC        NO         NO         NO     ALDEHYDES    SMOKE   PARTICULATES
PERCENT      GAS           GAS          (DRY)          2       (DRY)      (DRY)        2          X
 RATED       TEMP        PRESSURE        PPMV        (DRY)      PPMV       PPMV      (DRY)      (DRY)
 T.O.     DEGREES F        PSIA                    PERCENT V                         PPMV       PPMV

   0        -0.00         -0.00         590.00       1.13    1170.00       9.00       1.90       8.00      4.10       -0.00      -0.00
  61       880.00         25.00          45.00       2.10       3.00      37.00       5.00      40.00      2.00       -0.00      -0.00
  78       995.00         33.20          33.00       2.59       1.00      53.00       4.00      60.00      0.90       -0.00      -0.00
  90      1070.00         39.30          30.00       2.75       0.49      68.00       4.00      77.00      0.50       -0.00      -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   0        90.41    102.68      0.48   2720.76      2.27      2.01     -0.00     -0.00     -0.00     -0.00     -0.00     -0.00
  61         4.28      0.16      0.78   3137.35      5.78      6.25     21.91      0.84      4.00  16063.24     29.59     31.99
  78         2.55      0.04      0.51   3140.40      6.72      7.61     16.58      0.29      3.30  20444.01     43.71     49.51
  90         2.18      0.02      0.48   3141.04      8.12      9.19     16.49      0.15      3.61  23746.28     61.38     69.51


 POWER          CO                CO               THC                NO                 NO                NO
PERCENT                            2                                                      2                 X
 RATED     LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR       LB/1K#TH-HR        LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
  61          3.407           2498.172            0.130             4.601              0.62[illegible]             4.974
  78          2.017           2487.712            0.035             5.322              0.402             6.025
  90          1.730           2491.740            0.016             6.441              0.379             7.294
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DATE:  7/22/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS

ENGINE DATA ****************************************************************************************************

    CAL ID NUMBER:  145    ENGINE TYPE AND MODEL:  J57 - P10                 SERIAL NUMBER:     P604897

                           RATED THRUST:         10500.

    ENGINE TOTAL TIME:                                 4146. HRS

    TIME SINCE HOT SECTION OVERHAUL:                     0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                         0. HRS
         N2 COMPRESSOR OVERHAUL:                         0. HRS
         COMBUSTOR CAN REPLACEMENT:                      0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
         N1 TURBINE OVERHAUL:                            0. HRS
         N2 TURBINE OVERHAUL:                            0. HRS

    FUEL: JP-5                FUEL H/C RATIO:   1.970
OPERATIONAL DATA ***********************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   78.00   FINISH   80.00

    ATMOSPHERIC PRESSURE:              START   30.12   FINISH   30.14

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0127

    RELATIVE HUMIDITY:                      59.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  108.90,  FLOW RATE, LITERS/MIN:   -0.00

    SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   4

COMMENTS:

H/C CAL ESTIMATED


 CLOCK      TEST           POWER                 ENGINE           MEASURED    GAS GEN      CALC     COMPRESSOR     ENGINE      TURBINE
 TIME       MODE     THRUST,LBS  PERCENT          SPEED              FUEL     AIR FLOW     F/A      DISCHARGE     PRESSURE      INLET
                        OR        RATED            RPM               FLOW      LB/SEC                  TEMP         RATIO        TEMP
                        SHP       T.O.        N1          N2         LB/HR                          DEGREES F        EPR      DEGREES F

  -0.00     1/ 0      470.00        4     2135.00     5926.00     1070.00     -0.00   -0.000000      -0.00         -0.00        -0.00
  -0.00     2/ 1     6185.00       58     5465.00     8860.00     5050.00     -0.00   -0.000000      -0.00          1.81        -0.00
  -0.00     3/ 2     8161.00       77     5800.00     9173.00     6510.00     -0.00   -0.000000      -0.00          2.11        -0.00
  -0.00     4/ 3     9507.00       90     6010.00     9381.00     7600.00     -0.00   -0.000000      -0.00          2.31        -0.00


 POWER     EXHAUST      EXHAUST         CO           CO         THC        NO         NO          NO     ALDEHYDES   SMOKE   PARTICULATES
PERCENT      GAS          GAS         (DRY)          2         (DRY)     (DRY)        2           X
 RATED       TEMP       PRESSURE       PPMV        (DRY)        PPMV      PPMV      (DRY)       (DRY)
 T.O.     DEGREES F       PSIA                   PERCENT V                          PPMV        PPMV

   4        575.00       -0.00        620.00        1.21     1240.00     10.00      2.90       12.90      -0.00      -0.00       -0.00
  58        915.00       24.30         58.00        1.96       13.00     28.00      3.00       31.00      -0.00      -0.00       -0.00
  77       1040.00       33.10         39.00        2.29        4.00     50.00      3.00       53.00      -0.00      -0.00       -0.00
  90       1120.00       39.10         32.00        2.56        2.00     68.00      3.00       71.00      -0.00      -0.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX        CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   4        88.88    101.81      0.68   2725.56      2.35      3.04     95.11    108.94      0.73   2916.34      2.52      3.25
  58         5.90      0.76      0.50   3133.17      4.68      5.18     29.80      3.83      2.53  15822.52     23.63     26.16
  77         3.40      0.20      0.43   3138.63      7.14      7.59     22.15      1.30      2.80  20432.48     46.64     49.44
  90         2.50      0.09      0.38   3140.35      8.72      9.10     18.99      0.68      2.92  23866.68     66.27     69.20


 POWER         CO               CO               THC               NO                NO                NO
PERCENT                          2                                                    2                 X
 RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR       LB/1K#TH-HR      LB/1K#TH-HR       LB/1K#TH-HR
 T.O.

   4         202.353         6204.984          231.785            5.361            1.555             6.916
  58           4.818         2558.209            0.618            3.821            0.409             4.230
  77           2.714         2503.674            0.159            5.715            0.343             6.058
  90           1.997         2510.432            0.071            6.971            0.308             7.279
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DATE:   0/70/71

TEST ORGANIZATION:  S W R I KELLY

ENGINE SUPPLIER:    USAF, KELLY AFB

ENGINE DATA *************************************************************************************************

    CAL ID NUMBER:   14    ENGINE TYPE AND MODEL:  J-79                        SERIAL NUMBER:   GE 418312A

                           RATED THRUST:        10350.

    ENGINE TOTAL TIME:                               1492. HRS

    TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                        0. HRS
         N2 COMPRESSOR OVERHAUL:                       -0. HRS
         COMBUSTOR CAN REPLACEMENT:                     0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
         N1 TURBINE OVERHAUL:                           0. HRS
         N2 TURBINE OVERHAUL:                          -0. HRS

    FUEL: JP-4               FUEL H/C RATIO:   1.995

OPERATIONAL DATA ********************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   89.00   FINISH   89.00

    ATMOSPHERIC PRESSURE:              START   29.34   FINISH   29.34

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0176

    RELATIVE HUMIDITY:                     52.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

    SAMPLE LINE TRANSPORT TIME, SEC:     0.50

NUMBER OF TESTS:   5

COMMENTS:

AIRFLOW DATA NOT AVAILABLE FOR N1 LESS THAN 6000, F/A CALCULATED FROM EXHAUST
COMP.; NO2 DATA OBTAINED BY SUBTRACTION


ELAPSED    TEST          POWER                  ENGINE              MEASURED    GAS GEN      CALC      COMPRESSOR    ENGINE      TURBINE
 TIME      MODE    THRUST,LBS  PERCENT           SPEED                 FUEL     AIR FLOW      F/A      DISCHARGE    PRESSURE      INLET
                       OR       RATED             RPM                  FLOW      LB/SEC                   TEMP        RATIC        TEMP
                      SHP       T.O.         N1           N2          LB/HR                           DEGRFES F       EPR      DEGREES F

   0.0     7/ 0     260.00        2      5030.00      -0.00       1200.00      46.30    0.007200       -0.00        -0.00        -0.00
   7.15    3/ 7   10080.00       97      7690.00      -0.00       8850.00     163.40    0.015000       -0.00        -0.00        -0.00
  19.00    2/ 3    9250.00       89      7360.00      -0.00       8100.00     156.00    0.014400       -0.00        -0.00        -0.00
  29.00    1/ 2    6140.00       59      6830.00      -0.00       5200.00     125.50    0.011500       -0.00        -0.00        -0.00
  40.30    7/ 1     290.00        2      5015.00      -0.00       1150.00      44.40    0.007200       -0.00        -0.00        -0.00


 POWER     EXHAUST      EXHAUST          CO         CO         THC       NO         NO          NO       ALDEHYDES    SMOKE    PARTICULATES
PERCENT      GAS          GAS           (WET)        2        (WET)     (WET)        2           X
 RATED       TEMP       PRESSURE        PPMV       (WET)      PPMV      PPMV       (WET)       (WET)
 T.O.     DEGREES F       PSIA                   PERCENT V                          PPMV        PPMV

   2        666.00       -0.00        317.00       1.45     112.00      4.00       6.00       10.00       -0.00       -0.00       -0.00
  97       1165.00       -0.00         -0.00      -0.00      -0.00     -0.00      -0.00       -0.00       -0.00       -0.00       -0.00
  89       1142.00       -0.00         -0.00      -0.00      -0.00     -0.00      -0.00       -0.00       -0.00       -0.00       -0.00
  59        949.00       -0.00         -0.00      -0.00      -0.00     -0.00      -0.00       -0.00       -0.00       -0.00       -0.00
   2        680.00       -0.00        300.00       1.45      80.00      8.00       4.00       12.00       -0.00       -0.00       -0.00


 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   2       42.42      8.58      1.32   3048.67      0.88      2.20     50.90     10.30      1.58   3658.41      1.06      2.64
  97        0.20      0.11      0.33   3138.25      0.33      0.66      1.77      1.01      2.90  27773.48      2.90      5.81
  89        0.20      0.11      0.33   3138.25      0.33      0.66      1.62      0.93      2.66  25419.80      2.66      5.31
  59        0.20      0.11      0.33   3138.25      0.33      0.66      1.04      0.59      1.71  16318.88      1.71      3.41
   2       40.28      6.15      0.88   3058.72      1.76      2.65     46.32      7.07      1.01   3517.52      2.03      3.04


 POWER          CO               CO               THC               NO               NO               NO
PERCENT                            2                                                   2                X
 RATED     LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
 T.O.

   2         195.782        14070.805          39.617            4.058            6.087           10.145
  97           0.175         2755.306           0.100            0.288            0.288            0.576
  89           0.175         2748.086           0.100            0.287            0.287            0.575
  59           0.169         2657.799           0.097            0.278            0.278            0.555
   2         159.718        12129.383          24.393            6.996            3.498           10.494
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DATE:   7/ 1/71

TEST ORGANIZATION:  S W R I KELLY

ENGINE SUPPLIER:    USAF, KELLY AFB
*********************************************************************************************
ENGINE DATA ********************************************************************************
                                                              SERIAL NUMBER:   GE 434176
     CAL ID NUMBER:   15    ENGINE TYPE AND MODEL:  J-79

                         RATED THRUST:        10350.

                                                  1492. HRS
     FLGINE TOTAL TIME:
                                                     0. HRS
     TIME SINCE HOT SECTION OVERHAUL:

     TIME SINCE:
                                                     0. HRS
          N1 COMPRESSOR OVERHAUL:                   -0. HRS
          N2 COMPRESSOR OVERHAUL:                    0. HRS
          COMBUSTOR CAN REPLACEMENT:                 0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    0. HRS
          N1 TURBINE OVERHAUL:                      -0. HRS
          N2 TURBINE OVERHAUL:

     FUEL: JP-4              FUEL H/C RATIO:   1.995
*********************************************************************************************
OPERATIONAL DATA ****************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   88.00   FINISH   87.00

     ATMOSPHERIC PRESSURE:              START   29.26   FINISH   29.26

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0159

     RELATIVE HUMIDITY:                 53.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREFS C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    0.50

  NUMBER OF TESTS:   5

  COMMENTS:

  F/A CALCULATION BASED ON EXHAUST COMPOSITION FOR INITIAL AND FINAL RUNS.
  NO2 DETERMINED BY SUBTRACTION HC FOR FIRST RUN STILL SLOWLY DECREASING AT END
  OF MODE

                                                                                                        TURBINE
                                         ENGINE        MEASURED   GAS GEN     CALC     COMPRESSOR    ENGINE      INLET
  ELAPSED   TEST       POWER             SPEED          FUEL     AIR FLOW     F/A      DISCHARGE    PRESSURE     TEMP
   TIME     MODE   THRUST,LBS PERCENT     RPM           FLOW      LB/SEC                 TEMP        RATIO     DEGREES F
                       OR      RATED                    LB/HR                         DEGREES F      EPR
                      SHP      T.O.     N1       N2

     0.0    7/ 0    275.00       2   5060.00   -0.00   1275.00     48.50   0.007300     -0.00       -0.00       -0.00
   16.25    1/ 7   6650.00      64   6910.00   -0.00   5775.00    129.70   0.012400     -0.00       -0.00       -0.00
   27.15    2/ 1   9500.00      91   7400.00   -0.00   8350.00    156.40   0.014800     -0.00       -0.00       -0.00
   37.45    3/ 2  10100.00      97   7660.00   -0.00   8875.00    162.10   0.015200     -0.00       -0.00       -0.00
   47.40    7/ 3    300.00       2   5060.00   -0.00   1100.00     43.70   0.007000     -0.00       -0.00       -0.00

                                                                    NO        NO     ALDEHYDES   SMOKE   PARTICULATES
                                      CO       CO       THC       NO         2         X
  POWER   EXHAUST     EXHAUST        (WET)      2      (WET)    (WET)     (WET)     (WET)
 PERCENT    GAS         GAS          PPMV    (WET)     PPMV     PPMV      PPMV      PPMV
  RATED     TEMP      PRESSURE             PERCENT V
  T.O.   DEGREES F      PSIA

    2     675.00       -0.00        402.00    1.48    275.00     8.00      3.00     11.00     -0.00     -0.00     -0.00
   64     960.00       -0.00         44.00    2.33      1.00    39.00      4.00     43.00     -0.00     -0.00     -0.00
   91    1135.00       -0.00         29.00    2.75      0.0     62.00      6.00     68.00     -0.00     -0.00     -0.00
   97    1156.00       -0.00         23.00    2.77      0.0     70.00      7.00     77.00     -0.00     -0.00     -0.00
    2     640.00       -0.00        339.00    1.41     60.00    11.00      4.00     15.00     -0.00     -0.00     -0.00

                                                                                      MASS EMI  MASS EMI  MASS EMI  MASS EMI
                                                      MASS EMI  MASS EMI  MASS EMI  MASS EMI    NO2       CO2       NO        NOX
  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI        NO        NOX        CO        HC      LB/HR     LB/HR     LB/HR     LB/HR
 PERCENT     CO        HC        NO2       CO2        LB/1K     LB/1K     LB/HR     LB/HR
  RATED    LB/1K     LB/1K     LB/1K     LB/1K      LB FUEL   LB FUEL
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL

    2      51.89     20.33      0.64    3001.57      1.70      2.33     66.16     25.92      0.81   3827.01      2.16      2.97
   64       3.77      0.05      0.56    3132.82      5.48      6.04     21.74      0.28      3.25  18092.05     31.66     34.90
   91       2.10      0.0       0.72    3135.57      7.39      8.11     17.57      0.0       5.97  26181.96     61.71     67.68
   97       1.66      0.0       0.83    3136.27      8.29      9.11     14.71      0.0       7.35  27834.39     73.53     80.89
    2      46.71      4.73      0.91    3052.50      2.49      3.39     51.38      5.21      1.00   3357.74      2.74      3.73

                                                                                         NO
                                                                          NO              X
                                 CO                THC          NO         2        LB/1K#TH-HR
  POWER         CO                2                                   LB/1K#TH-HR
 PERCENT                     LB/1K#TH-HR       LB/1K#TH-HR   LB/1K#TH-HR
  RATED     LB/1K#TH-HR
  T.O.

    2        240.576        13916.387           94.255         7.864       2.949        10.813
   64          3.273         2720.609            0.043         4.761       0.488         5.249
   91          1.850         2755.996            0.0           6.496       0.629         7.124
   97          1.456         2755.879            0.0           7.280       0.728         8.009
    2        171.265        11192.477           17.361         9.128       3.319        12.447
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DATE:   7/ 2/71

TEST ORGANIZATION:  S W R I/ KELLY

ENGINE SUPPLIER:    USAF, KELLY AFB
ENGINE DATA ***************************************************************************************************************
                                                                              SERIAL NUMBER:   GE-E418975
     CAL ID NUMBER:   16    ENGINE TYPE AND MODEL:  J-79

                            RATED THRUST:          10350.

                                                    2075. HRS
     ENGINE TOTAL TIME:
                                                       0. HRS
     TIME SINCE HOT SECTION OVERHAUL:

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                      0. HRS
          N2 COMPRESSOR OVERHAUL:                     -0. HRS
          COMBUSTOR CAN REPLACEMENT:                   0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      0. HRS
          N1 TURBINE OVERHAUL:                         0. HRS
          N2 TURBINE OVERHAUL:                        -0. HRS

     FUEL: JP-4               FUEL H/C RATIO:   1.995
OPERATIONAL DATA ***********************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   91.00   FINISH   89.00

     ATMOSPHERIC PRESSURE:              START   29.26   FINISH   29.26

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0153

     RELATIVE HUMIDITY:                   43.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  150.00,  FLOW RATE, LITERS/MIN:   42.50

     SAMPLE LINE TRANSPORT TIME, SEC:    0.50

 NUMBER OF TESTS:   5

 COMMENTS:

 F/A CALCULATION BASED ON EXHAUST COMPOSITION FOR INITIAL AND FINAL RUNS.
 NO2 DETERMINED BY SUBTRACTION

                                                                                                  COMPRESSOR   ENGINE     TURBINE
                                                ENGINE            MEASURED   GAS GEN     CALC     DISCHARGE   PRESSURE     INLET
 ELAPSED    TEST        POWER                   SPEED               FUEL     AIR FLOW     F/A        TEMP      RATIO        TEMP
  TIME      MODE    THRUST,LBS  PERCENT          RPM                FLOW     LB/SEC              DEGREES F     EPR      DEGREES F
                        OR       RATED                              LB/HR
                       SHP       T.O.       N1           N2                                                                -0.00
                                                                                                    -0.00      -0.00       -0.00
                                   3     5050.00       -0.00      1200.00     43.80    0.007600     -0.00      -0.00       -0.00
   0.0      7/ 0     320.00        9     7685.00       -0.00      8775.00    161.50    0.015100     -0.00      -0.00       -0.00
  11.05     3/ 7    1000.00       88     7380.00       -0.00      8000.00    153.90    0.014400     -0.00      -0.00       -0.00
  20.15     2/ 3    9200.00       59     6910.00       -0.00      5150.00    128.10    0.011200     -0.00      -0.00
  30.00     1/ 2    6150.00        3     5060.00       -0.00      1180.00     43.70    0.007500
  39.30     7/ 1     340.00

                                                                           NO          NO     ALDEHYDES   SMOKE   PARTICULATES
 POWER     EXHAUST      EXHAUST        CO         CO        THC       NO          2           X
 PERCENT     GAS          GAS         (WET)        2       (WET)     (WET)      (WET)       (WET)
 RATED      TEMP       PRESSURE       PPMV       (WET)      PPMV      PPMV       PPMV        PPMV
 T.O.     DEGREES F      PSIA                  PERCENT V                                                             -0.00
                                                                                           11.00      -0.00     -0.00     -0.00
   3    [illegible].30      -0.00        371.00       1.53    124.00      7.00       4.00      76.00      -0.00     -0.00     -0.00
   9      1157.00       -0.00         23.00       2.85      1.00     71.00       5.00      61.00      -0.00     -0.00     -0.00
  88      1130.00       -0.00         43.00       2.68      1.00     56.00       5.00      36.00      -0.00     -0.00     -0.00
  59       909.00       -0.00         38.00       2.19      0.0      32.00       4.00      10.00      -0.00     -0.00
   3       649.00       -0.00        305.00       1.51     62.00      7.00       3.00

                                                                                                     MASS EMI   MASS EMI   MASS EMI
                                                                                           MASS EMI     CO2        NO         NOX
 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI     NO2      LB/HR      LB/HR      LB/HR
 PERCENT     CO        HC       NO2       CO2       NO        NOX        CO        HC       LB/HR
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL                          1.00    3648.60       1.75       2.74
                                                   1.45      2.29      56.31     10.78        5.05   27520.44      71.67      76.72
   3       46.92      8.98      0.83   3040.50     8.17      8.74      14.14      0.35        4.89   25069.82      54.76      59.65
   9        1.61      0.04      0.58   3136.23     6.85      7.46      25.60      0.34        3.08   16137.19      24.65      27.73
  88        3.20      0.04      0.61   3133.73     4.79      5.38      17.82      0.0         0.75    3615.98       1.75       2.53
  59        3.46      0.0       0.60   3133.43     1.49      2.12      46.48      5.41
   3       39.39      4.59      0.64   3064.39

                                                                                                  NO
                                                                                   NO             X
 POWER          CO                  CO               THC              NO            2        LB/1K*TH-HR
 PERCENT                             2                                         LB/1K*TH-HR
 RATED     LB/1K*TH-HR         LB/1K*TH-HR       LB/1K*TH-HR      LB/1K*TH-HR
 T.O.                                                                                          8.570
                                                    33.683            5.453         3.116      76.720
   3        175.963           11401.887              0.352           71.672         5.047       6.484
   9         14.135           27520.438              0.037            5.952         0.531       4.509
  88          2.783            2724.981              0.0              4.008         0.501       7.363
  59          2.898            2623.933             15.917            5.154         2.209
   3        136.720           10635.238
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DATE: 7/ 6/71

TEST ORGANIZATION: S W R I KELLY

ENGINE SUPPLIER: USAF, KELLY AFB

ENGINE DATA **

CAL ID NUMBER: 17 ENGINE TYPE AND MODEL: J-79 SERIAL NUMBER: GF 418312B

RATED THRUST: 10350.

ENGINE TOTAL TIME: 2149. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 0. HRS
N2 COMPRESSOR OVERHAUL: -0. HRS
COMBUSTOR CAN REPLACEMENT: 0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: 0. HRS
N1 TURBINE OVERHAUL: 0. HRS
N2 TURBINE OVERHAUL: -0. HRS

FUEL: JP-4 FUEL H/C RATIO: 1.995

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 80.00 FINISH 83.00

ATMOSPHERIC PRESSURE: START 29.35 FINISH 29.35

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0167

RELATIVE HUMIDITY: 66.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 150.00, FLOW RATE, LITERS/MIN: 42.50

SAMPLE LINE TRANSPORT TIME, SEC: 0.50

NUMBER OF TESTS: 7

COMMENTS:

F/A CALCULATIONS BASED ON EXHAUST COMPOSITION FOR FIRST, FIFTH AND SEVENTH RUNS
NO2 DETERMINED BY SUBTRACTION

ELAPSED TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
0.0	7/ 0	230.00	2	4965.00	-0.00	1175.00	45.90	0.007100	-0.00	-0.00	-0.00
17.00	3/ 7	10250.00	99	7665.00	-0.00	8850.00	163.60	0.015200	-0.00	-0.00	-0.00
34.00	2/ 3	9620.00	92	7380.0C	-0.00	8200.00	157.80	0.014400	-0.00	-0.0C	-0.00
44.00	1/ 2	6310.00	60	6880.00	-0.00	5300.00	130.30	0.011300	-0.00	-0.00	-0.00
52.00	7/ 1	230.00	2	5000.00	-0.00	1170.00	43.90	0.007400	-0.00	-0.CC	-0.00
54.00	3/ 7	10200.00	98	7665.00	-0.00	8850.00	163.60	0.015200	-0.00	-0.00	-0.00
62.30	7/ 3	245.00	2	5000.00	-0.00	1175.00	41.80	0.007800	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (WET) PPMV	CO_2 (WET) PERCENT V	THC (WET) PPMV	NO (WET) PPMV	NO_2 (WET) PPMV	NO_X (WET) PPMV	ALDEHYDES	SMOKE	PARTICULATES
2	654.00	-0.00	385.00	1.43	145.00	4.00	5.00	9.00	-0.00	-0.00	-0.00
99	1158.00	-0.00	13.00	2.96	0.0	71.00	6.00	77.00	-0.00	-0.00	-0.00
92	1135.00	-0.00	29.00	2.78	1.00	58.00	6.00	64.00	-0.00	-0.00	-0.00
60	924.00	-0.00	43.00	2.37	1.00	32.00	5.00	37.00	-0.00	-0.00	-0.00
2	652.00	-0.00	352.00	1.50	112.00	4.00	6.00	10.00	-0.00	-0.00	-0.00
98	1160.00	-0.00	13.00	2.88	0.0	74.00	8.00	82.00	-0.00	-0.00	-0.00
2	654.00	-0.00	351.00	1.58	105.00	4.00	6.00	10.00	-0.00	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
2	51.86	11.19	1.11	3026.69	0.89	1.99	60.94	13.14	1.30	3556.36	1.04	2.34
99	0.88	0.0	0.66	3137.49	7.87	8.53	7.76	0.0	5.88	27766.82	69.63	75.51
92	2.08	0.04	0.71	3135.49	6.84	7.55	17.07	0.34	5.80	25711.02	56.08	61.88
60	3.62	0.05	0.69	3133.06	4.42	5.11	19.17	0.26	3.66	16605.19	23.44	27.10
2	45.47	8.29	1.27	3044.69	0.85	2.12	53.20	9.70	1.49	3562.28	0.99	2.48
98	0.90	0.0	0.91	3137.46	8.43	9.34	7.98	0.0	8.06	27766.48	74.58	82.65
2	43.13	7.39	1.21	3050.82	0.81	2.02	50.68	8.68	1.42	3584.71	C.95	2.37

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_X LB/1K#TH-HR
2	264.950	15462.453	57.150	4.522	5.652	10.173
99	0.757	2708.958	0.0	6.793	0.574	7.367
92	1.774	2672.663	0.035	5.829	0.603	6.432
60	3.039	2631.568	0.040	3.714	0.580	4.295
2	231.320	15488.191	42.154	4.318	6.477	10.794
98	0.782	2722.204	0.0	7.312	0.790	8.103
2	206.871	14631.484	35.443	3.872	5.809	9.681

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DATE:   7/ 9/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:   97    ENGINE TYPE AND MODEL:  TF30 P&C                 SERIAL NUMBER:     652017

                            RATED THRUST:         11500.

     ENGINE TOTAL TIME:                            1101. HRS

     TIME SINCE HOT SECTION OVERHAUL:               851. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                   460. HRS
          N2 COMPRESSOR OVERHAUL:                   851. HRS
          COMBUSTOR CAN REPLACEMENT:                 -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:    -0. HRS
          N1 TURBINE OVERHAUL:                      525. HRS
          N2 TURBINE OVERHAUL:                      777. HRS

     FUEL: JP-5               FUEL H/C RATIO:   1.970
OPERATIONAL DATA *******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   76.00   FINISH   76.00

     ATMOSPHERIC PRESSURE:              START   30.04   FINISH   30.04

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0167

     RELATIVE HUMIDITY:                    86.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  121.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

 NUMBER OF TESTS:   4

 COMMENTS:

 H/C CAL ESTIMATED


                                                                                                          TURBINE
                                                                                   COMPRESSOR   ENGINE    INLET
                                                   MEASURED  GAS GEN     CALC      DISCHARGE   PRESSURE   TEMP
 CLOCK     TEST        POWER               ENGINE    FUEL    AIR FLOW     F/A        TEMP       RATIC   DEGREES F
 TIME      MODE   THRUST,LBS  PERCENT      SPEED     FLOW    LB/SEC                DEGREES F     EPR
                      OR       RATED        RPM      LB/HR
                     SHP       T.O.      N1       N2

                                                                                    -0.00      -0.00       -0.00
  -0.00    1/ 0     -0.00        0      -0.00    -0.00     -0.00    -0.00  -0.000000   -0.00       1.53       -0.00
  -0.00    2/ 1   5961.00       51    7725.00 12840.00   3410.00    -0.00  -0.000000   -0.00       1.73       -0.00
  -0.00    3/ 2   7905.00       68    8500.00 13453.00   4550.00    -0.00  -0.000000   -0.00       2.07       -0.00
  -0.00    4/ 3  11160.00       97    9697.00 14417.00   6915.00    -0.00  -0.000000


                                      CO        CO      THC      NO       NO       NO    ALDEHYDES   SMOKE   PARTICULATES
 POWER   EXHAUST     EXHAUST        (DRY)        2     (DRY)   (DRY)      2        X
 PERCENT   GAS         GAS          PPMV      (DRY)    PPMV    PPMV     (DRY)    (DRY)
 RATED    TEMP       PRESSURE              PERCENT V                    PPMV     PPMV
 T.O.   DEGREES F      PSIA
                                                                         3.00    3.00    -0.00     -0.00     -0.00
   0      -0.00       -0.00       815.00     1.84    -0.00    -0.00     4.00    4.00    -0.00     -0.00     -0.00
  51    1483.00       15.50        20.00     2.42    -0.00    -0.00     8.00    0.0     -0.00     -0.00     -0.00
  68    1650.00       21.40        13.00     2.62    -0.00    -0.00     4.00    4.00    -0.00     -0.00     -0.00
  97    1990.00       31.40        11.00     2.88    -0.00    -0.00


                                                                                      MASS EMI  MASS EMI  MASS EMI  MASS EMI
 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI   NO2       CO2       NO        NOX
 PERCENT     CO        HC       NO2       CO2       NO        NOX       CO        HC      LB/HR     LB/HR     LB/HR     LB/HR
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL
                                                                                  -0.00     -0.00      0.00     -0.00
   0       84.89     -0.00      0.51   3011.15     -0.00      0.51     -0.00      0.00      1.85  10713.97     -0.00      1.85
  51        1.65     -0.00      0.54   3141.93     -0.00      0.54      5.64     -0.00      4.56  14300.48     -0.00      0.0
  68        0.99     -0.00      1.00   3142.96     -0.00      0.0       4.52     -0.00      3.16  21736.08     -0.00      3.16
  97        0.76     -0.00      0.46   3143.32     -0.00      0.46      5.28     -0.00


                                                                                           NO
                                          CO              THC              NO              NO
 POWER             CO                      2                                                2                X
 PERCENT                                                                              LB/1K#TH-HR      LB/1K#TH-HR
 RATED        LB/1K#TH-HR            LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
 T.O.

***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
                                                                                   0.311            0.311
  51          0.945                1797.344          -0.000           -0.000           0.577            0.0
  68          0.571                1809.043          -0.000           -0.000           0.283            0.283
  97          0.473                1947.677          -0.000           -0.000
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DATE:   7/ 9/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS

ENGINE DATA ************************************************************************************************

     CAL ID NUMBER:   99    ENGINE TYPE AND MODEL:  TF30 P6C                  SERIAL NUMBER:    P652063

                          RATED THRUST:        11500.

     ENGINE TOTAL TIME:                                  0. HRS

     TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                        0. HRS
          N2 COMPRESSOR OVERHAUL:                        0. HRS
          COMBUSTOR CAN REPLACEMENT:                     0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
          N1 TURBINE OVERHAUL:                           0. HRS
          N2 TURBINE OVERHAUL:                           0. HRS

     FUEL: JP-5              FUEL H/C RATIO:   1.970
OPERATIONAL DATA *******************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   86.00   FINISH   86.50

     ATMOSPHERIC PRESSURE:              START   30.08   FINISH   30.05

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0146

     RELATIVE HUMIDITY:                      55.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  126.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   6

COMMENTS:

H/C CAL ESTIMATED


                                                                                                                 TURBINE
                                                             MEASURED    GAS GEN      CALC     COMPRESSOR    ENGINE      INLET
 CLOCK     TEST          POWER            ENGINE               FUEL     AIR FLOW       F/A     DISCHARGE    PRESSURF      TEMP
  TIME     MODE   THRUST,LBS  PERCENT      SPEED               FLOW      LB/SEC                   TEMP       RATIO     DEGREES F
                      OR       RATED        RPM               LB/HR                            DEGREES F      EPR
                     SHP       T.O.     N1          N2

                                                                                                 -0.00        -0.00       -0.00
  -0.00    1/ 0      -0.00       0     -0.00       -0.00      -0.00      -0.00  -0.000000        -0.00        -0.00       -0.00
  -0.00    1/ 1      -0.00       0     -0.00       -0.00      -0.00      -0.00  -0.000000        -0.00        -0.0C       -0.00
  -0.00    1/ 1     680.00       5   3190.00     8430.00     700.00      -0.00  -0.000000        -0.00        -0.00       -0.00
  -0.00    2/ 1    5390.00      46   7586.00    12826.00    3120.00      -0.00  -0.000000        -0.00         1.64       -0.00
  -0.00    3/ 2    7156.00      62   8340.0C    13365.00    4130.00      -0.00  -0.000000        -0.00         2.05       -0.00
  -0.00    4/ 3   11081.00      96   9998.00    14381.00    6810.00      -0.00  -0.000000


                                                                         NO         NO       ALDEHYDES    SMOKE    PARTICULATES
 POWER    EXHAUST     EXHAUST        CO        CO        THC       NO         2          X
PERCENT     GAS         GAS         (DRY)        2       (DRY)    (DRY)     (DRY)      (DRY)
 RATED     TEMP       PRESSURE      PPMV      (DRY)      PPMV     PPMV      PPMV       PPMV
 T.O.    DEGREES F      PSIA                PERCENT V

                                                                                       9.00     -0.00       -0.00      -0.00
   0       -0.00       -0.00       625.00      1.82    255.00      5.00      4.00      5.00     -0.00       -0.00      -0.00
   0       -0.00       -0.00       610.00      1.81    220.00     10.00      4.00      4.90      5.90       -0.00      -0.00
   5      955.00       -0.00       622.06      1.86    225.00      4.90      4.00     38.00      0.90       -0.00      -C.00
  46     1465.00       13.80        62.00      2.50     14.00     46.00      8.00     60.00      0.90       -0.00      -0.00
  62     1635.00       18.80        38.00      2.80      9.00     65.00      9.00    133.00      0.90       -0.00      -C.00
  96     1990.00       30.80        32.00      3.35      7.00    135.00      8.00


                                                                                  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI     NO2       CO2        NO       NOX
PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC       LB/HR     LB/HR     LP/HP     LB/HR
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR
 T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

                                                                                   -0.00      -0.00     -0.00     -0.00
   0      65.56     15.32      0.69   2999.50      0.86      1.55     -C.00     -0.00     -0.00      -0.00     -0.00     -0.00
   0      64.49     13.32      0.69   3006.65      1.74      0.87     -0.00     -0.00      0.47    2105.30      0.58      0.58
   5      64.01     13.26      0.68   3007.57      0.83      0.83     44.81      9.28      3.27    9781.18     18.81     15.54
  46       4.95      0.64      1.05   3135.00      6.03      4.98     15.44      2.00      4.36   12965.12     31.46     29.04
  62       2.71      0.37      1.05   3139.25      7.62      7.03     11.20      1.52      5.34   21389.30     90.11     68.77
  96       1.91      0.24      0.78   3140.87     13.23     13.04     13.00      1.63


                                                                                    NO
 POWER        CO              CO             THC             NO          NO          X
PERCENT                        2                                          2     LB/1K#TH-HR
 RATED   LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR  LB/1K#TH-HR
 T.O.

***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
                                             13.652          0.853        0.696        0.853
   5         65.894        3096.024           0.370          3.491        0.607        2.884
  46          2.864        1814.691           0.212          4.397        0.609        4.059
  62          1.565        1811.783           0.147          8.132        0.482        8.011
  96          1.174        1930.269
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DATE:   6/30/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    PRATT AND WHITNEY

ENGINE DATA ***************************************************************************************************************

     CAL ID NUMBER:  107    ENGINE TYPE AND MODEL:  TF30 P5C                 SERIAL NUMBER:    651983

                            RATED THRUST:        11500.

     ENGINE TOTAL TIME:                                 1160. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          0. HRS
          N2 COMPRESSOR OVERHAUL:                          0. HRS
          COMBUSTOR CAN REPLACEMENT:                       0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
          N1 TURBINE OVERHAUL:                             0. HRS
          N2 TURBINE OVERHAUL:                             0. HRS

     FUEL: JP-5                 FUEL H/C RATIO:   1.970

OPERATIONAL DATA **********************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   86.00   FINISH   87.00

     ATMOSPHERIC PRESSURE:              START   30.02   FINISH   29.99

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0180

     RELATIVE HUMIDITY:                     65.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  118.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   5

COMMENTS:

H/C CAL ESTIMATED
PROBE J57 (EPA) MOD 2


  CLOCK      TEST            POWER                 ENGINE             MEASURED   GAS GEN      CALC     COMPRESSOR     ENGINE       TURBINE
  TIME       MODE     THRUST,LBS  PERCENT          SPEED                FUEL     AIR FLOW     F/A      DISCHARGE     PRESSURE       INLET
                          OR       RATED            RPM                 FLOW     LB/SEC                  TEMP         RATIO          TEMP
                         SHP       T.O.        N1          N2          LB/HR                          DEGREES F        EPR        DEGREES F

  -0.00      2/ 0     5668.00       49     7630.00  12856.00      3135.00     -0.00   -0.000000       -0.00         1.48          -0.00
  -0.00      3/ 2     7443.00       64     8370.00  13398.00      4130.00     -0.00   -0.000000       -0.00         1.65          -0.00
  -0.00      3/ 3     7443.00       64     8370.00  13398.00      4130.00     -0.00   -0.000000       -0.00         1.65          -0.00
  -0.00      4/ 3    11457.00       99     9811.00  14557.00      6885.00     -0.00   -0.000000       -0.00         2.06          -0.00
  -0.00      4/ 4    11430.00       99     9811.00  14580.00      6865.00     -0.00   -0.000000       -0.00         2.06          -0.00


  POWER    EXHAUST      EXHAUST          CO         CO         THC       NO         NO         NO      ALDEHYDES   SMOKE   PARTICULATES
 PERCENT     GAS          GAS           (DRY)        2        (DRY)     (DRY)        2          X
  RATED      TEMP      PRESSURE         PPMV       (DRY)       PPMV      PPMV      (DRY)      (DRY)
  T.O.    DEGREES F      PSIA                    PERCENT V                          PPMV       PPMV

   49      1349.00       14.00          36.00       1.40      -0.00      10.00      4.00      14.00       1.00      -0.00       -0.00
   64      1499.00       19.00          27.00       2.20      -0.00      35.00      2.50      37.50       3.00      -0.00       -0.00
   64      1499.00       19.00          19.00       2.04      -0.00      35.00      2.50      37.50       2.00      -0.00       -0.00
   99      1865.00       31.00          18.00       3.52      -0.00     120.00      5.00     125.00       1.00      -0.00       -0.00
   99      2005.00       31.00          23.00       3.50      -0.00     120.00      6.00     126.00      -0.00      -0.00       -0.00


  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 PERCENT      CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2       CO2       NO        NOX
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

   49        5.13     -0.00      0.94   3136.46      2.34      3.28     16.09     -0.00      2.94   9832.80      7.34     10.28
   64        2.45     -0.00      0.37   3140.67      5.22      5.60     10.13     -0.00      1.54  12970.96     21.57     23.11
   64        1.86     -0.00      0.40   3141.60      5.63      6.04      7.69     -0.00      1.66  12974.79     23.27     24.93
   99        1.02     -0.00      0.47   3142.92     11.20     11.67      7.04     -0.00      3.21  21638.98     77.12     80.33
   99        1.31     -0.00      0.56   3142.46     11.26     11.83      9.02     -0.00      3.87  21572.98     77.32     81.19


  POWER         CO               CO               THC               NO               NO               NO
 PERCENT                          2                                                   2                X
  RATED    LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR
  T.O.

   49         2.839          1734.791          -0.000            1.295            0.516            1.814
   64         1.361          1742.706          -0.000            2.898            0.207            3.105
   64         1.033          1743.220          -0.000            3.127            0.223            3.350
   99         0.615          1888.712          -0.000            6.731            0.280            7.012
   99         0.789          1887.400          -0.000            6.765            0.338            7.103
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DATE:  7/19/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:     NORFOLK NAS                    ***************************************************************************************************

ENGINE DATA *************************************************************************         SERIAL NUMBER:      P659159

     CAL ID NUMBER:  142      ENGINE TYPE AND MODEL:  TF30 P6C

                               RATED THRUST:          11500.

                                                        1103. HRS
     ENGINE TOTAL TIME:
                                                          0. HRS
     TIME SINCE HOT SECTION OVERHAUL:

     TIME SINCE:
                                                          0. HRS
          N1 COMPRESSOR OVERHAUL:                         0. HRS
          N2 COMPRESSOR OVERHAUL:                         0. HRS
          COMBUSTOR CAN REPLACEMENT:                      0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:         0. HRS
          N1 TURBINE OVERHAUL:                            0. HRS
          N2 TURBINE OVERHAUL:

     FUEL: JP-5                FUEL H/C RATIO:   1.970
                                                            ***********************************************************************
OPERATIONAL DATA ***************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   83.50   FINISH   84.00

                                        START   29.83   FINISH   29.83
     ATMOSPHERIC PRESSURE:

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0166

                                         67.00  PERCENT
     RELATIVE HUMIDITY:

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  108.90,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   4

COMMENTS:

H/C CAL ESTIMATED

                                                                                                                               TURBINE
                                                                                                         ENGINE               INLET
                                                            MEASURED    GAS GEN      CALC     COMPRESSOR  PRESSURE              TEMP
                        POWER                 ENGINE          FUEL     AIR FLOW      F/A      DISCHARGE   RATIO             DEGREES F
 CLOCK       TEST   THRUST,LBS PERCENT         SPEED           FLOW      LB/SEC                   TEMP      EPR
 TIME        MODE       OR      RATED           RPM            LB/HR                          DEGREES F
                       SHP       T.O.       N1        N2

 -0.00       1/ 0     640.00       5     3129.00   8267.00    665.00     -0.00   -0.000000    -0.00      -0.00           -0.00
 -0.00       2/ 1    5781.00      50     7703.00  12735.00   3260.00     -0.00   -0.000000    -0.00       1.51           -0.00
 -0.00       3/ 2    7618.00      66     8454.00  13266.00   4320.00     -0.00   -0.000000    -0.00       1.70           -0.00
 -0.00       4/ 3   11050.00      96     9825.00  14300.00   6895.00     -0.00   -0.000000    -0.00      -0.00           -0.00

                                                                      NO        NO        ALDEHYDES   SMOKE    PARTICULATES
                                        CO         THC       NO        2         X
  POWER    EXHAUST     EXHAUST   CO      2        (DRY)     (DRY)    (DRY)     (DRY)
 PERCENT     GAS         GAS    (DRY)  (DRY)       PPMV      PPMV     PPMV      PPMV
  RATED      TEMP     PRESSURE  PPMV  PERCENT V
  T.O.    DEGREES F     PSIA

    5      912.00       -0.00   302.00   0.85     -0.00      6.00     1.90      4.00      1.70       -0.00     -0.00
   50     1470.00       14.90    70.00   2.46     -0.00     35.00     8.00     38.00      0.50       -0.00     -0.00
   66     1635.00       20.50    46.00   2.78     -0.00     53.00     4.00     61.00      0.80       -0.00     -0.00
   96     1988.00       31.50    33.00   3.58     -0.00    130.00     4.00    132.00      0.50       -0.00     -0.00

                                                                                                               MASS EMI
                                                                                                  MASS EMI     NOX
                                                                        MASS EMI MASS EMI MASS EMI   NO      LB/HR
  POWER   MASS EMI MASS EMI MASS EMI MASS EMI MASS EMI MASS EMI MASS EMI   HC      NO2      CO2     LB/HR
 PERCENT     CO       HC      NO2      CO2      NO       NOX      CO     LB/HR    LB/HR    LB/HR
  RATED    LB/1K    LB/1K    LB/1K    LB/1K    LB/1K    LB/1K    LB/HR
  T.O.    LB FUEL  LB FUEL  LB FUEL  LB FUEL  LB FUEL  LB FUEL

    5      68.67    -0.00     0.71   3036.63    2.24     1.49    45.66    -0.00     0.47   2019.36     1.49      0.99
   50       5.68    -0.00     1.07   3135.60    4.66     5.06    18.51    -0.00     3.48  10222.05    15.20     16.51
   66       3.31    -0.00     0.47   3139.33    6.26     7.20    14.28    -0.00     2.04  13561.90    27.03     31.11
   96       1.84    -0.00     0.37   3141.63   11.93    12.11    12.71    -0.00     2.53  21661.52    82.23     83.50

                                                                            NO                NO
                                                           NO                2                 X
                            CO            THC                         LB/1K#TH-HR        LB/1K#TH-HR
  POWER        CO            2
 PERCENT                LB/1K#TH-HR   LB/1K#TH-HR      LB/1K#TH-HR
  RATED    LB/1K#TH-HR
  T.O.

    5        71.348      3155.251        -0.000           2.328            0.737              1.552
   50         3.202      1768.216        -0.000           2.630            0.601              2.855
   66         1.875      1780.244        -0.000           3.548            0.268              4.084
   96         1.150      1960.319        -0.000           7.442            0.229              7.556
```

```
DATE:   7/23/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS
ENGINE DATA ********************************************************************************************************
     CAL ID NUMBER:  154    ENGINE TYPE AND MODEL:  TF30 P6C                    SERIAL NUMBER:    P651947

                            RATED THRUST:        11500.

                                                 976. HRS
     ENGINE TOTAL TIME:

                                                 275. HRS
     TIME SINCE HOT SECTION OVERHAUL:

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                275. HRS
          N2 COMPRESSOR OVERHAUL:                275. HRS
          COMBUSTOR CAN REPLACEMENT:             -0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:-0. HRS
          N1 TURBINE OVERHAUL:                   275. HRS
          N2 TURBINE OVERHAUL:                     0. HRS

     FUEL: JP-5                FUEL H/C RATIO:   1.970
OPERATIONAL DATA ***************************************************************************************************
     INLET AIR TEMPERATURE, DEGREES F:  START   74.00   FINISH   75.00

     ATMOSPHERIC PRESSURE:              START   30.05   FINISH   30.05

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0114

     RELATIVE HUMIDITY:                 89.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  107.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   4

COMMENTS:

H/C CAL ESTIMATED


                                                                                                           TURBINE
                                                                                 COMPRESSOR     ENGINE       INLET
                                            ENGINE        MEASURED   GAS GEN    CALC  DISCHARGE    PRESSURE      TEMP
  CLOCK      TEST       POWER                SPEED          FUEL    AIR FLOW    F/A     TEMP         RATIO     DEGREES F
  TIME       MODE  THRUST,LBS  PERCENT       RPM            FLOW     LB/SEC          DEGREES F       EPR
                       OR       RATED                       LB/HR
                       SHP      T.O.     N1        N2

  -0.00      1/ 0    670.00       5   3186.00   8369.00    700.00    -0.00  -0.000000    -0.00       -0.00        -0.00
  -0.00      2/ 1   6046.00      52   7790.00  12878.00   3420.00    -0.00  -0.000000    -0.00        1.54        -0.00
  -0.00      3/ 2   8024.00      69   8575.00  13485.00   4570.00    -0.00  -0.000000    -0.00        7.73        -0.00
  -0.00      4/ 3  11160.00      97   9720.00  14348.00   6810.00    -0.00  -0.000000    -0.00        2.05        -0.00


                                                              NO        NO        NO     ALCEHYDES   SMOKE   PARTICULATES
  POWER    EXHAUST     EXHAUST        CO        CO      THC                2         X
 PERCENT     GAS         GAS        (DRY)        2    (DRY)   (DRY)     (DRY)     (DRY)
  RATED     TEMP      PRESSURE      PPMV      (DRY)    PPMV    PPMV      PPMV      PPMV
  T.O.    DEGREES F     PSIA               PERCENT V

    5       920.00      -0.00      314.00      0.78   139.00     2.00      1.90      3.90      2.60     -0.00      -0.00
   52      1470.00      15.80       66.00      2.39     1.00    40.00      8.00     48.00      0.70     -0.00      -0.00
   69      1640.00      21.40       43.00      2.82     0.49    62.00      5.00     67.00      1.10     -0.00      -0.00
   97      1945.00      30.90       34.00      3.42     0.49   125.00      4.00    129.00      1.20     -0.00      -0.00


                                                                                         MASS EMI  MASS EMI  MASS EMI  MASS EMI
  POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI    NO2       CO2        NO       NOX
 PERCENT     CO        HC       NO2       CO2        NO       NOX        CO        HC      LB/HR     LB/HR     LB/HR     LB/HR
  RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR
  T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    5      76.14     19.30      0.76   2971.92      0.80      1.55     53.30     13.51      0.53   2080.35      0.56      1.09
   52       5.51      0.05      1.10   3135.74      5.49      6.58     18.85      0.16      3.75  10724.21     18.76     22.52
   69       3.05      0.02      0.58   3139.68      7.22      7.40     13.92      0.09      2.66  14348.35     32.98     35.64
   97       1.99      0.02      0.38   3141.35     12.00     12.39     13.54      0.11      2.62  21392.64     81.74     84.39


                                                                              NO
                                 CO                THC           NO            2            NO
  POWER         CO                2                                                          X
 PERCENT                   LB/1K#TH-HR       LB/1K#TH-HR    LB/1K#TH-HR   LB/1K#TH-HR   LB/1K#TH-HR
  RATED     LB/1K#TH-HR
  T.O.

    5          79.553        3104.994          20.169          0.832         0.791         1.623
   52           3.117        1773.770           0.027          3.103         0.621         3.724
   69           1.735        1788.179           0.011          4.110         0.351         4.441
   97           1.213        1916.903           0.010          7.324         0.234         7.559
```

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DATE:   7/26/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS
                                                                                                    ********
ENGINE DATA ****************************************************************************************
                                                                             SERIAL NUMBER:   P664444
     CAL ID NUMBER:  155    ENGINE TYPE AND MODEL:  TF30-P8

                            RATED THRUST:         12500.
                                                       967. HRS
     ENGINE TOTAL TIME:
                                                       967. HRS
     TIME SINCE HOT SECTION OVERHAUL:

     TIME SINCE:
                                                       967. HRS
          N1 COMPRESSOR OVERHAUL:                      967. HRS
          N2 COMPRESSOR OVERHAUL:                      967. HRS
          COMBUSTOR CAN REPLACEMENT:                   967. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      967. HRS
          N1 TURBINE OVERHAUL:                         967. HRS
          N2 TURBINE OVERHAUL:

     FUEL: JP-5                  FUEL H/C RATIO:   1.970
                                                                                                    ********
OPERATIONAL DATA ***********************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   86.50   FINISH   86.50

     ATMOSPHERIC PRESSURE:              START   29.86   FINISH   29.86

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0174

     RELATIVE HUMIDITY:                    64.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  107.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

  NUMBER OF TESTS:   3

  COMMENTS:

  H/C CAL ESTIMATED

                                                                                                                         TURBINE
                                                                   MEASURED   GAS GEN       CALC     COMPRESSOR    ENGINE      INLET
                            POWER                   ENGINE           FUEL     AIR FLOW       F/A     DISCHARGE    PRESSURE     TEMP
  CLOCK      TEST     THRUST,LBS  PERCENT           SPEED            FLOW     LB/SEC                    TEMP        RATIO    DEGREES F
  TIME       MODE         OR       RATED             RPM             LB/HR                          DEGRFES F       EPR
                         SHP        T.O.       N1         N2
                                                                                                      -0.00        -0.00       -0.00
  -0.00      1. 0        -0.00       0        -0.00      -0.00       -0.00      -0.00   -0.000000     -0.00         1.67       -0.00
  -0.00      3/ 1      7953.00      63      8465.00   13570.00     4360.00      -0.00   -0.000000     -0.00         2.01       -0.00
  -0.00      4/ 3     11237.00      89      9640.00   14405.00     6520.00      -0.00   -0.000000

                                                                                            NO       ALDEHYDES   SMOKE   PARTICULATES
                                                   CO            THC       NO       NO       X
  POWER    EXHAUST     EXHAUST          CO          2           (DRY)    (DRY)      2      (DRY)
  PERCENT    GAS         GAS           (DRY)      (DRY)          PPMV     PPMV    (DRY)     PPMV
  RATED     TEMP       PRESSURE        PPMV     PERCENT V                          PPMV
  T.O.    DEGREES F      PSIA
                                                                                            4.00       5.70       -0.00      -0.00
    0        -0.00       -0.00        360.00      0.79       187.00     2.00     2.00      88.00       0.50       -0.00      -0.00
   63      1655.00       19.60         22.00      2.65         1.00    85.00     3.00     153.00       0.20       -0.00      -0.00
   89      1915.00       29.50          9.00      3.15         1.00   150.00     3.00

                                                                                                     MASS EMI  MASS EMI  MASS EMI
                                                                          MASS EMI  MASS EMI  MASS EMI  CO2       NO        NOX
  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI   CO        HC        NO2     LB/HR     LB/HR     LB/HR
  PERCENT     CO        HC        NO2       CO2       NO        NOX     LB/HR     LB/HR     LB/HR
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL
                                                                                            -0.00     -0.00     -0.00     -0.00
    0       85.29     25.37      0.78   2940.89      0.78      1.56     -0.00     -0.00      1.62  13698.24     45.93     47.55
   63        1.66      0.04      0.37   3141.80     10.53     10.91      7.24      0.19      2.04  20495.79    102.03    104.07
   89        0.57      0.04      0.31   3143.53     15.65     15.96      3.73      0.24

                                                                                          NO
                                                                          NO               X
  POWER          CO               CO              THC           NO         2
  PERCENT                          2                                  LB/1K#TH-HR   LB/1K#TH-HR
  RATED      LB/1K#TH-HR      LB/1K#TH-HR      LB/1K#TH-HR   LB/1K#TH-HR
  T.O.
                                                                                       5.979
  ***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***                     0.204       9.261
   63           0.910         1722.399          0.024          5.775        0.182
   89           0.332         1823.956          0.021          9.080
```

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DATE:   7/19/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS
                                                                                             ****************************************
ENGINE DATA ***************************************************************************************
                                                                          SERIAL NUMBER:     P661536
    CAL ID NUMBER:  106    ENGINE TYPE AND MODEL:  J52 - P8A

                              RATED THRUST:          9300.
                                                       369. HRS
    ENGINE TOTAL TIME:
                                                       242. HRS
    TIME SINCE HOT SECTION OVERHAUL:

    TIME SINCE:
                                                       369. HRS
         N1 COMPRESSOR OVERHAUL:                       369. HRS
         N2 COMPRESSOR OVERHAUL:                       369. HRS
         COMBUSTOR CAN REPLACEMENT:                    369. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:       369. HRS
         N1 TURBINE OVERHAUL:                          624. HRS
         N2 TURBINE OVERHAUL:

    FUEL: JP-5                 FUEL H/C RATIO:   1.970
*****************************************************************************************************
OPERATIONAL DATA ***************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START    74.00   FINISH   74.00

    ATMOSPHERIC PRESSURE:              START    29.74   FINISH   29.75

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0116

    RELATIVE HUMIDITY:                  92.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  104.00,  FLOW RATE, LITERS/MIN:   -0.00

    SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   4

COMMENTS:

H/C CAL ESTIMATED

                                                                                                                   TURBINE
                                                         MEASURED   GAS GEN     CALC      COMPRESSOR    ENGINE      INLET
                                          ENGINE          FUEL     AIR FLOW     F/A       DISCHARGE    PRESSURE     TEMP
 CLOCK     TEST       POWER               SPEED           FLOW      LB/SEC                  TEMP        RATIO     DEGREES F
 TIME      MODE   THRUST,LBS  PERCENT      RPM            LB/HR                           DEGREES F      EPR
                      OR       RATED    N1         N2
                     SHP       T.O.
  -0.00    1/ 0     -0.00        0     -0.00      -0.00     -0.00     -0.00   -0.000000     -0.00       -0.00       -0.00
  -0.00    2/ 1   5920.00       63     -0.00    1106.00   4420.00     -0.00   -0.000000     -0.00        2.09       -0.00
  -0.00    3/ 2   7720.00       83     -0.00   11628.00   5915.00     -0.00   -0.000000     -0.00       -0.00       -0.00
  -0.00    4/ 3   8626.00       92     -0.00   11909.00   6800.00     -0.00   -0.000000     -0.00       -0.00       -0.00

                                                                                  NO       ALDEHYDES   SMOKE   PARTICULATES
                                       CO          CO        THC       NO       NO         X
 POWER     EXHAUST      EXHAUST      (DRY)          2       (DRY)    (DRY)       2      (DRY)
 PERCENT     GAS          GAS         PPMV       (DRY)      PPMV     PPMV     (DRY)     PPMV
 RATED      TEMP       PRESSURE                PERCENT V                      PPMV
 T.O.    DEGREES F      PSIA
   0        -0.00       -0.00       330.00      1.07      -0.00      8.00     1.90      8.00      2.10       -0.00      -0.00
  63        89.50       32.00        70.00      2.36       9.00     35.00     9.00     39.00      0.70       -0.00      -0.00
  83      1048.00       42.60        50.00      2.85      -0.00     57.00     3.00     68.00      0.60       -0.00      -0.00
  92      1140.00       47.90        26.00      3.07       0.90     80.00     3.00     85.00      0.50       -0.00      -0.00

                                                                                                                   MASS EMI
                                                                        MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI   CO        HC        NO2       CO2       NO        NOX
 PERCENT    CO        HC        NO2       CO2       NO        NOX     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K
 T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL
   0      59.88     -0.00      0.57    3050.44     2.38      2.38     -0.00      0.00     -0.00      -0.00    -0.00     -0.00
  63       5.92      0.44      1.11    3134.03     4.86      5.41     26.15      1.93      4.91   13852.43    21.48     23.93
  83       3.50     -0.00      0.35    3139.02     6.56      7.83     20.73     -0.00      2.04   18567.28    38.82     46.31
  92       1.69      0.03      0.32    3141.77     8.56      9.09     11.52      0.23      2.18   21364.04    58.20     61.24

                                                                       NO                 NO
                              CO                THC         NO          2                  X
 POWER        CO               2                                 LB/1K#TH-HR        LB/1K#TH-HR
 PERCENT                  LB/1K#TH-HR       LB/1K#TH-HR   LB/1K#TH-HR
 RATED    LB/1K#TH-HR
 T.O.

***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
  63         4.417        2339.937           0.325         3.628         0.829              4.042
  83         2.685        2405.088          -0.000         5.029         0.265              5.999
  92         1.335        2476.703           0.026         6.747         0.253              7.169
```

DATE: 7/22/71

TEST ORGANIZATION: SCOTT/NORFOLK

ENGINE SUPPLIER: NORFOLK NAS

ENGINE DATA **

CAL ID NUMBER: 146 ENGINE TYPE AND MODEL: TF30-P8B SERIAL NUMBER: P664169

RATED THRUST: 12500.

ENGINE TOTAL TIME: 991. HRS

TIME SINCE HOT SECTION OVERHAUL: 991. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL: 552. HRS
N2 COMPRESSOR OVERHAUL: 261. HRS
COMBUSTOR CAN REPLACEMENT: 562. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL: -0. HRS
N1 TURBINE OVERHAUL: 261. HRS
N2 TURBINE OVERHAUL: 261. HRS

FUEL: JP-5 FUEL H/C RATIO: 1.970

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 77.00 FINISH 77.00

ATMOSPHERIC PRESSURE: START 30.11 FINISH 30.11

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0120

RELATIVE HUMIDITY: 62.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 110.00, FLOW RATE, LITERS/MIN: -0.00

SAMPLE LINE TRANSPORT TIME, SEC: -0.00

NUMBER OF TESTS: 4

COMMENTS:

H/C CAL ESTIMATED

CLOCK TIME	TEST MODE	POWER THRUST.LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGREES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREES F
-0.00	1/ 0	650.00	5	3040.00	8460.00	700.00	-0.00	-0.000000	-0.00	-0.00	-0.00
-0.00	2/ 1	6261.00	50	7810.00	13160.00	3440.00	-0.00	-0.000000	-0.00	1.52	-0.00
-0.00	3/ 2	8313.00	66	8535.00	13685.00	4570.00	-0.00	-0.000000	-0.00	1.70	-0.00
-0.00	4/ 3	11396.00	91	9660.00	14505.00	6680.00	-0.00	-0.000000	-0.00	2.03	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PPMV	CO_2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO_2 (DRY) PPMV	NO_x (DRY) PPMV	ALDEHYDES	SMOKE	PARTICULATES
5	915.00	-0.00	285.00	0.65	158.00	4.00	3.00	7.00	3.10	-0.00	-0.00
50	1505.00	15.20	23.00	2.30	4.90	70.00	7.00	77.00	0.90	-0.00	-0.00
66	1670.00	20.70	22.00	2.75	1.00	113.00	8.00	121.00	1.10	-0.00	-0.00
91	1930.00	30.30	19.00	3.25	2.00	177.00	6.00	183.00	1.60	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
5	82.15	26.08	1.42	2943.89	1.89	3.31	57.51	18.26	0.99	2060.72	1.33	2.32
50	2.00	0.24	1.00	3140.72	9.99	10.99	6.88	0.84	3.44	10804.06	34.37	37.81
66	1.60	0.04	0.96	3141.90	13.50	14.45	7.31	0.19	4.37	14358.46	61.68	66.05
91	1.17	0.07	0.61	3142.49	17.89	18.50	7.81	0.47	4.05	20991.86	119.52	123.57

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_x LB/1K#TH-HR
5	88.471	3170.338	28.090	2.040	1.530	3.569
50	1.098	1725.613	0.134	5.490	0.549	6.039
66	0.879	1727.230	0.023	7.420	0.525	7.945
91	0.685	1842.037	0.041	10.487	0.356	10.843

```
DATE:  7/13/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS

ENGINE DATA ************************************************************************************************

    CAL ID NUMBER:  101    ENGINE TYPE AND MODEL:  TF30 P408              SERIAL NUMBER:    664241

                           RATED THRUST:        13400.

    ENGINE TOTAL TIME:                                    0. HRS

    TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                          0. HRS
         N2 COMPRESSOR OVERHAUL:                          0. HRS
         COMBUSTOR CAN REPLACEMENT:                       0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
         N1 TURBINE OVERHAUL:                             0. HRS
         N2 TURBINE OVERHAUL:                             0. HRS

    FUEL: JP-5               FUEL H/C RATIO:   1.970

OPERATIONAL DATA ***********************************************************************************************

    INLET AIR TEMPERATURE, DEGREES F:  START   78.00   FINISH   78.00

    ATMOSPHERIC PRESSURE:              START   29.94   FINISH   29.94

    INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0157

    RELATIVE HUMIDITY:                     76.00  PERCENT

    SAMPLE LINE:  TEMPERATURE, DEGREES C:  101.00,  FLOW RATE, LITERS/MIN:   -0.00

    SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   4

COMMENTS:

H/C CAL ESTIMATED


                          POWER                    ENGINE           MEASURED   GAS GEN      CALC     COMPRESSOR    ENGINE      TURBINE
 CLOCK     TEST                                    SPEED              FUEL     AIR FLOW     F/A      DISCHARGE    PRESSURE      INLET
 TIME      MODE     THRUST,LBS  PERCENT             RPM               FLOW     LB/SEC                  TEMP        RATIO        TEMP
                        OR       RATED                                LB/HR                          DEGREES F       EPR      DEGREES F
                       SHP       T.O.        N1          N2
                                                                                                                                -0.00
  -0.00    17/ 0       -0.00        0     3227.00     8635.00       795.00     -0.00   -0.000000       -0.00        -0.00        -0.00
  -0.00    18/17     8023.00       59     8242.00    13380.00      4500.00     -0.00   -0.000000       -0.00         1.82        -0.00
  -0.00    19/18    10698.00       79     9070.00    14000.00      6210.00     -0.00   -0.000000       -0.00         2.15        -0.00
  -0.00    10/19    12417.00       92     9705.00    14468.00      7590.00     -0.00   -0.000000       -0.00         2.37


                                                 CO       THC       NO        NO        NO     ALDEHYDES   SMOKE   PARTICULATES
 POWER    EXHAUST     EXHAUST        CO           2      (DRY)     (DRY)       2         X
PERCENT     GAS         GAS        (DRY)                  PPMV      PPMV     (DRY)     (DRY)
 RATED      TEMP      PRESSURE      PPMV       (DRY)                          PPMV      PPMV
 T.O.    DEGRFES F      PSIA                 PERCENT V
                                                                                        4.90      2.20     -0.00      -0.00
   0      960.00       -0.00       485.00        1.20     120.00      3.00      5.00     49.00      0.40     -0.00      -0.00
  59     1645.00       24.10        36.00        2.31       4.00     48.00      8.00     85.00      0.30     -0.00      -0.00
  79     1855.00       33.60        22.00        2.80       4.00     84.00      9.00    132.00      0.40     -0.00      -0.00
  92     2035.00       40.00        20.00        3..0       4.00    130.00      8.00


                                                                                                    MASS EMI  MASS EMI  MASS EMI
 POWER   MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI    CO2        NO        NOX
PERCENT     CO        HC        NO2       CO2       NO        NOX       CO        HC        NO2      LB/HR      LB/HR     LB/HR
 RATED    LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR
 T.O.    LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL                                                          1.02
                                                                                            1.04    2379.91      0.62     31.32
   0      77.00     10.91      1.30   2993.60      0.78      1.28     61.22      8.67      5.11   14125.89     30.69     61.91
  59       3.11      0.20      1.14   3139.09      6.82      6.96     14.01      0.89      6.56   19509.38     61.19    106.16
  79       1.57      0.16      1.06   3141.61      9.85      9.97      9.76      1.02      6.43   23848.49    104.55
  92       1.29      0.15      0.85   3142.09     13.77     13.99      9.79      1.12


                                                                                             NO
                                   CO             THC             NO             NO             X
 POWER          CO                  2                                             2         LB/1K*TH-HR
PERCENT                                       LB/1K*TH-HR     LB/1K*TH-HP    LB/1K*TH-HR
 RATED      LB/1K*TH-HR        LB/1K*TH-HR
 T.O.

***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
  59            1.746          1760.675          0.111          3.825          0.637          3.904
  79            0.912          1823.647          0.095          5.719          0.613          5.787
  92            0.789          1920.632          0.090          8.420          0.518          8.549
```

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DATE:   7/14/71

TEST ORGANIZATION:   SCOTT/NORFOLK

ENGINE SUPPLIER:     NORFOLK NAS
ENGINE DATA ************************************************************************************************************
    CAL ID NUMBER:  102     ENGINE TYPE AND MODEL:  TF30 P408                    SERIAL NUMBER:     664371

                         RATED THRUST:         13400.

    ENGINE TOTAL TIME:                               1021. HRS

    TIME SINCE HOT SECTION OVERHAUL:                    0. HRS

    TIME SINCE:

         N1 COMPRESSOR OVERHAUL:                        0. HRS
         N2 COMPRESSOR OVERHAUL:                        0. HRS
         COMBUSTOR CAN REPLACEMENT:                     0. HRS
         FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:        0. HRS
         N1 TURBINE OVERHAUL:                           0. HRS
         N2 TURBINE OVERHAUL:                           0. HRS

    FUEL: JP-5                FUEL H/C RATIO:   1.970
OPERATIONAL DATA *******************************************************************************************************
     INLET AIR TEMPERATURE, DEGREES F:  START   85.50   FINISH   85.00

     ATMOSPHERIC PRESSURE:              START   29.69   FINISH   29.69

     INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0173

     RELATIVE HUMIDITY:                  68.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:   98.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

NUMBER OF TESTS:   4

COMMENTS:

H/C CAL ESTIMATED

                                                                                                              TURBINE
                                               ENGINE       MEASURED   GAS GEN     CALC     COMPRESSOR   ENGINE    INLET
 CLOCK     TEST        POWER                    SPEED         FUEL     AIR FLOW     F/A     DISCHARGE   PRESSURE    TEMP
 TIME      MODE    THRUST,LBS  PERCENT          RPM           FLOW      LB/SEC                TEMP       RATIC    DEGREES F
                       OR       RATED                         LB/HR                        DEGPEES F      EPR
                      SHP       T.O.      N1        N2
  -0.00    1/ 0      -0.00        0    3228.00   8666.00     770.00     -0.00   -0.000000     -0.00       -0.00      -0.00
  -0.00    2/ 1       8.53        0    8269.00  13455.00    4375.00     -0.00   -0.000000     -0.00        1.80      -0.00
  -0.00    3/ 2    1065.60        7    9059.00  14077.00    5960.00     -0.00   -0.000000     -0.00        2.11      -0.00
  -0.00    4/ 3   12366.00       92    9647.00  14540.00    7230.00     -0.00   -0.000000     -0.00        2.33      -0.00

                                                                  NO         NO     ALDEHYDES   SMCKE   PARTICULATES
                                       CO         CO     THC      NO          2          X
 POWER    EXHAUST    EXHAUST          (DRY)        2    (DRY)    (DRY)      (DRY)      (DRY)
 PERCENT    GAS        GAS             PPMV      (DRY)   PPMV     PPMV       PPMV       PPMV
 RATED     TEMP      PRESSURE                 PERCENT V
 T.O.   DEGREES F      PSIA
    0     980.00      -0.00          540.00     1.44   260.00    11.00      1.90       8.00      5.20     -0.00      -0.00
    0    1650.00      23.10           29.00     2.50     1.00    50.00      5.00      54.00      1.20     -0.00      -0.00
    7    1850.00      32.20           21.00     2.83     1.00    90.00      4.00      91.00      1.20     -0.00      -0.00
   92    2020.00      38.50           18.00     3.10     1.00   135.00      3.00     135.00      1.10     -0.00      -C.00

                                                                               MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI
 POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI         CO        HC       NO2       CO2       NO       NCX
 PERCENT     CO        HC       NO2       CO2       NO        NOX          LB/HR     LB/HR     LB/HR     LB/HR     LB/HR     LB/HR
 RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K
 T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL
    0      71.10     19.61      0.41   2979.03      2.38      1.73         54.75     15.10      0.32   2293.85      1.83      1.33
    0       2.32      0.05      0.66   3140.76      6.57      7.09         10.14      0.20      2.87  13740.80     28.73     31.03
    7       1.48      0.04      0.46   3142.08     10.45     10.56          8.84      0.24      2.77  18726.79     62.26     62.95
   92       1.16      0.04      0.32   3142.60     14.31     14.31          8.40      0.27      2.30  22720.98    103.44    103.44

                                                                                         NO
                                                                          NO              X
 POWER        CO               CO             THC            NO            2         LB/1K#TH-HR
 PERCENT                        2                                     LB/1K#TH-HR
 RATED    LB/1K#TH-HR     LB/1K#TH-HR     LB/1K#TH-HR    LB/1K#TH-HR
 T.O.

***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
    0        1189.277     1610879.000        23.487       3368.025       336.802       3637.465
    7           8.300       17573.949         0.226         58.426         2.597         59.075
   92           0.679        1837.375         0.022          8.365         0.186          8.365
```

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DATE:   7/16/71

TEST ORGANIZATION:  SCOTT/NORFOLK

ENGINE SUPPLIER:    NORFOLK NAS
*****************************************************************************************************
ENGINE DATA ******************************************************************************************
                                                                    SERIAL NUMBER:    671490
     CAL ID NUMBER:  104    ENGINE TYPE AND MODEL:  TF30 P408

                            RATED THRUST:        13400.

                                                   626. HRS
      ENGINE TOTAL TIME:
                                                    0. HRS
      TIME SINCE HOT SECTION OVERHAUL:

      TIME SINCE:
                                                    0. HRS
           N1 COMPRESSOR OVERHAUL:                  0. HRS
           N2 COMPRESSOR OVERHAUL:                  0. HRS
           COMBUSTOR CAN REPLACEMENT:               0. HRS
           FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:  0. HRS
           N1 TURBINE OVERHAUL:                     0. HRS
           N2 TURBINE OVERHAUL:

      FUEL: JP-5              FUEL H/C RATIO:   1.970
*****************************************************************************************************
OPERATIONAL DATA *************************************************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   80.50   FINISH   82.00

      ATMOSPHERIC PRESSURE:              START   29.89   FINISH   29.89

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0149

      RELATIVE HUMIDITY:                65.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:   98.00,  FLOW RATE, LITERS/MIN:   -0.00

      SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

   NUMBER OF TESTS:   2

   COMMENTS:

   H/C CAL ESTIMATED

                                                                                                     TURBINE
                                                                                         ENGINE       INLET
                                                  MEASURED   GAS GEN     CALC  COMPRESSOR  PRESSURE     TEMP
                       POWER            ENGINE       FUEL    AIR FLOW    F/A   DISCHARGE    RATIO    DEGREES F
   CLOCK     TEST   THRUST,LBS PERCENT   SPEED       FLOW    LB/SEC               TEMP       EPR
   TIME      MODE      OR       RATED     RPM       LB/HR                      DEGREES F
                       SHP       T.O.   N1      N2

                                                                                         -0.00         -0.00
                                                              -0.00  -0.000000   -0.00   -0.00         -0.00
   -0.00     1/ 0    780.00       5  3272.00  8713.00   780.00  -0.00  -0.000000   -0.00
   -0.00     4/ 1  12060.00      89  9721.00 14524.00  7420.00

                                                                NO    ALDEHYDES  SMOKE  PARTICULATES
                                               THC     NO      NO      X
   POWER   EXHAUST    EXHAUST       CO     CO   (DRY)  (DRY)    2    (DRY)
  PERCENT    GAS        GAS       (DRY)     2   PPMV   PPMV   (DRY)   PPMV
   RATED    TEMP     PRESSURE     PPMV   (DRY)                PPMV
   T.O.   DEGREES F    PSIA             PERCENT V
                                                                                       -0.00
                                                                10.00   0.50   -0.00   -0.00
     5      -0.00      -0.00    535.00    1.58  231.00  10.00   1.90  166.00   8.50   -0.00
    89      -0.00      -0.00     22.00    3.35    3.00 158.00   3.00

                                                                                       MASS EMI  MASS EMI
                                                          MASS EMI MASS EMI MASS EMI MASS EMI    NO       NOX
   POWER   MASS EMI MASS EMI MASS EMI MASS EMI MASS EMI MASS EMI  CO       HC       NO2      CO2     LB/HR    LB/HR
  PERCENT     CO       HC      NO2      CO2      NO      NOX    LB/HR    LB/HR    LB/HR    LB/HR
   RATED    LB/1K    LB/1K    LB/1K    LB/1K    LB/1K    LB/1K
   T.O.    LB FUEL  LB FUEL  LB FUEL  LB FUEL  LB FUEL  LB FUEL                                      1.55
                                                                 12.47     0.29  2339.32     1.55   120.78
     5      64.63    15.98     0.38  2999.12     1.98     1.98    50.41    0.76     2.18 23314.96   114.96
    89       1.31     0.10     0.29  3142.18    15.49    16.28     9.74

                                                                              NO
                                                                NO             X
   POWER        CO            CO           THC          NO       2         LB/1K#TH-HR
  PERCENT                      2                              LB/1K#TH-HR
   RATED    LB/1K#TH-HR   LB/1K#TH-HR   LB/1K#TH-HR   LB/1K#TH-HR
   T.O.                                                                       1.984
                                                          1.984      0.377    10.015
     5        64.633       2999.124      15.983          9.532      0.181
    89         0.808       1933.247       0.063
```

DATE: 7/20/71

TEST ORGANIZATION: SCOTT/NORFOLK

ENGINE SUPPLIER: NORFOLK NAS

ENGINE DATA **

CAL ID NUMBER: 143 ENGINE TYPE AND MODEL: TF30 P408 SERIAL NUMBER: P671484

RATED THRUST: 13400.

ENGINE TOTAL TIME: 390. HRS

TIME SINCE HOT SECTION OVERHAUL: 0. HRS

TIME SINCE:

N1 COMPRESSOR OVERHAUL:	0. HRS
N2 COMPRESSOR OVERHAUL:	0. HRS
COMBUSTOR CAN REPLACEMENT:	0. HRS
FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:	0. HRS
N1 TURBINE OVERHAUL:	0. HRS
N2 TURBINE OVERHAUL:	0. HRS

FUEL: JP-5 FUEL H/C RATIO: 1.970

OPERATIONAL DATA **

INLET AIR TEMPERATURE, DEGREES F: START 79.00 FINISH 80.00

ATMOSPHERIC PRESSURE: START 29.82 FINISH 29.83

INLET AIR HUMIDITY, LBS H2O/LB AIR: 0.0160

RELATIVE HUMIDITY: 70.00 PERCENT

SAMPLE LINE: TEMPERATURE, DEGREES C: 110.00, FLOW RATE, LITERS/MIN: -0.00

SAMPLE LINE TRANSPORT TIME, SEC: -0.00

NUMBER OF TESTS: 4

COMMENTS:

H/C CAL ESTIMATED

CLOCK TIME	TEST MODE	POWER THRUST,LBS OR SHP	POWER PERCENT RATED T.O.	ENGINE SPEED RPM N1	ENGINE SPEED RPM N2	MEASURED FUEL FLOW LB/HR	GAS GEN AIR FLOW LB/SEC	CALC F/A	COMPRESSOR DISCHARGE TEMP DEGRFES F	ENGINE PRESSURE RATIO EPR	TURBINE INLET TEMP DEGREFS F
-0.00	1/ 0	795.00	5	3252.00	8688.00	785.00	-0.00	-0.000000	-0.00	-0.00	-0.00
-0.00	2/ 1	7827.00	58	8202.00	13365.00	4375.00	-0.00	-0.000000	-0.00	1.79	-0.00
-0.00	3/ 2	10509.00	78	9087.00	14027.00	6000.00	-0.00	-0.000000	-0.00	2.12	-0.00
-0.00	4/ 3	12264.00	91	9670.00	14497.00	7330.00	-0.00	-0.000000	-0.00	2.34	-0.00

POWER PERCENT RATED T.O.	EXHAUST GAS TEMP DEGREES F	EXHAUST GAS PRESSURE PSIA	CO (DRY) PPMV	CO_2 (DRY) PERCENT V	THC (DRY) PPMV	NO (DRY) PPMV	NO_2 (DRY) PPMV	NO_x (DRY) PPMV	ALDEHYDES	SMOKE	PARTICULATES
5	974.00	-0.00	530.00	1.55	23.30	11.00	3.00	10.00	10.10	-0.00	-0.00
58	1625.00	23.20	42.00	2.93	1.00	54.00	8.00	57.00	0.40	-0.00	-0.00
78	1840.00	32.80	26.00	3.10	0.90	108.00	7.00	102.00	0.50	-0.00	-0.00
91	2015.00	39.20	25.00	3.20	1.00	139.00	4.00	143.00	0.50	-0.00	-0.00

POWER PERCENT RATED T.O.	MASS EMI CO LB/1K LB FUEL	MASS EMI HC LB/1K LB FUEL	MASS EMI NO2 LB/1K LB FUEL	MASS EMI CO2 LB/1K LB FUEL	MASS EMI NO LB/1K LB FUEL	MASS EMI NOX LB/1K LB FUEL	MASS EMI CO LB/HR	MASS EMI HC LB/HR	MASS EMI NO2 LB/HR	MASS EMI CO2 LB/HR	MASS EMI NO LB/HR	MASS EMI NOX LB/HR
5	66.07	1.66	0.61	3036.14	2.25	2.05	51.87	1.31	0.48	2383.37	1.77	1.61
58	2.86	0.04	0.90	3139.92	6.05	6.39	12.53	0.17	3.92	13737.13	26.47	27.94
78	1.68	0.03	0.74	3141.80	11.44	10.81	10.06	0.20	4.45	18850.79	68.66	64.84
91	1.56	0.04	0.41	3141.97	14.27	14.68	11.45	0.26	3.01	23030.64	104.58	107.59

POWER PERCENT RATED T.O.	CO LB/1K#TH-HR	CO_2 LB/1K#TH-HR	THC LB/1K#TH-HR	NO LB/1K#TH-HR	NO_2 LB/1K#TH-HR	NO_x LB/1K#TH-HR
5	65.243	2997.954	1.643	2.224	0.607	2.022
58	1.601	1755.095	0.022	3.381	0.501	3.569
78	0.958	1793.776	0.019	6.533	0.423	6.170
91	0.934	1877.906	0.021	8.527	0.245	8.773

```
DATE:   7/27/71

TEST ORGANIZATION:   SCOTT/NORFOLK

ENGINE SUPPLIER:     NORFOLK NAS

ENGINE DATA ********************************************************************************************************

     CAL ID NUMBER:  156    ENGINE TYPE AND MODEL:  TF30 P408                 SERIAL NUMBER:     P664193

                         RATED THRUST:          13400.

     ENGINE TOTAL TIME:                                  508. HRS

     TIME SINCE HOT SECTION OVERHAUL:                      0. HRS

     TIME SINCE:

          N1 COMPRESSOR OVERHAUL:                          0. HRS
          N2 COMPRESSOR OVERHAUL:                          0. HRS
          COMBUSTOR CAN REPLACEMENT:                       0. HRS
          FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:          0. HRS
          N1 TURBINE OVERHAUL:                             0. HRS
          N2 TURBINE OVERHAUL:                             0. HRS

     FUEL:  JP-5                 FUEL H/C RATIO:   1.970

OPERATIONAL DATA ***************************************************************************************************

     INLET AIR TEMPERATURE, DEGREES F:  START   83.00   FINISH   83.00

     ATMOSPHERIC PRESSURE:              START   29.93   FINISH   29.93

     INLET AIR HUMIDITY, LBS H2O/LB AIR:    0.0169

     RELATIVE HUMIDITY:                     69.00  PERCENT

     SAMPLE LINE:  TEMPERATURE, DEGREES C:  126.00,  FLOW RATE, LITERS/MIN:   -0.00

     SAMPLE LINE TRANSPORT TIME, SEC:   -0.00

  NUMBER OF TESTS:   4

  COMMENTS:

  H/C CAL ESTIMATED


                          POWER                    ENGINE            MEASURED    GAS GEN       CALC     COMPRESSOR     ENGINE      TURBINE
  CLOCK     TEST      THRUST,LBS  PERCENT          SPEED               FUEL      AIR FLOW      F/A      DISCHARGE     PRESSURE      INLET
  TIME      MODE          OR       RATED            RPM                FLOW      LB/SEC                   TEMP         RATIO        TEMP
                         SHP       T.O.        N1          N2          LB/HR                            DEGREES F       EPR       DEGREES F

  -0.00     1/ 0        -0.00        0     3238.00     8565.00        775.00      -0.00     -0.000000      -0.00        -0.00        -0.00
  -0.00     2/ 1      7714.00       57     8243.00    13401.00       4310.00      -0.00     -0.000000      -0.00         1.77        -0.00
  -0.00     3/ 2     10348.00       77     9082.00    14065.00       5970.00      -0.00     -0.000000      -0.00         2.08        -0.00
  -0.00     4/ 3     12090.00       90     9687.00    14543.00       7210.00      -0.00     -0.000000      -0.00         2.30        -0.00


                                                 CO         THC        NO          NO          NO      ALDEHYDES   SMOKE   PARTICULATES
  POWER     EXHAUST      EXHAUST         CO       2        (DRY)      (DRY)          2           X
  PERCENT     GAS          GAS         (DRY)    (DRY)      PPMV       PPMV        (DRY)       (DRY)
  RATED      TEMP        PRESSURE      PPMV    PERCENT V                          PPMV        PPMV
  T.O.     DEGREES F       PSIA

    0        984.00       -0.00       540.00     1.59     265.00      12.00        2.00       14.00       0.80      -0.00      -0.00
   57       1655.00       22.50        42.00     2.78       1.00      58.00        5.00       63.00       0.10      -0.00      -0.00
   77       1883.00       31.60        28.00     3.17       1.00     102.00        3.00      105.00       0.04      -0.00      -0.00
   90       2055.00       38.10        24.00     3.50       0.90     160.00        4.00      164.00       0.30      -0.00      -0.00


                                                                                                                  MASS EMI   MASS EMI   MASS EMI
  POWER    MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI  MASS EMI     CO2         NO        NOX
  PERCENT     CO        HC       NO2       CO2        NO       NOX        CO        HC        NO2      LB/HR       LB/HR      LB/HR
  RATED     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/1K     LB/HR     LB/HR     LB/HR
  T.O.     LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL   LB FUEL

    0       64.69     18.18      0.39   2992.99      2.36      2.75     50.14     14.09      0.31     2319.57      1.43       2.14
   57        3.02      0.04      0.59   3139.67      6.85      7.44     13.01      0.18      2.54    13531.96     29.51      32.06
   77        1.77      0.04      0.31   3141.65     10.57     10.88     10.54      0.22      1.86    18755.65     63.09      64.94
   90        1.37      0.03      0.38   3142.29     15.02     15.39      9.89      0.21      2.71    22655.90    108.27     110.98


                                 CO                                          NO                NO
  POWER          CO               2               THC           NO            2                 X
  PERCENT
  RATED     LB/1K*TH-HR      LB/1K*TH-HR      LB/1K*TH-HR     LB/1K*TH-HR     LB/1K*TH-HR     LB/1K*TH-HR
  T.O.

***HORSEPOWER-HR OR THRUST-HR BASIS NOT CALCULABLE***
   57          1.687           1754.208         0.023           3.826           0.330           4.156
   77          1.019           1812.490         0.021           6.097           0.179           6.276
   90          0.818           1873.937         0.018           8.955           0.224           9.179
```

```
DATE:   7/19/71

TEST ORGANIZATION:  UNITED/EPA

ENGINE SUPPLIER:    UNITED AIRLINES
ENGINE DATA ****************************************************************************************************
     CAL ID NUMBER:  135    ENGINE TYPE AND MODEL:  JT4A -11                 SERIAL NUMBER:    611170

                            RATED THRUST:        17500.

      ENGINE TOTAL TIME:                          16271. HRS

      TIME SINCE HOT SECTION OVERHAUL:            16271. HRS

      TIME SINCE:

           N1 COMPRESSOR OVERHAUL:                      -0. HRS
           N2 COMPRESSOR OVERHAUL:                      -0. HRS
           COMBUSTOR CAN REPLACEMENT:                   -0. HRS
           FIRST STAGE NOZZLE GUIDE VANE OVERHAUL:      -0. HRS
           N1 TURBINE OVERHAUL:                         -0. HRS
           N2 TURBINE OVERHAUL:                         -0. HRS

      FUEL: JET - A              FUEL H/C RATIO:   1.920
OPERATIONAL DATA ***********************************************************************************************

      INLET AIR TEMPERATURE, DEGREES F:  START   59.00   FINISH   57.20

      ATMOSPHERIC PRESSURE:              START   29.93   FINISH   29.95

      INLET AIR HUMIDITY, LBS H2O/LB AIR:   0.0086

      RELATIVE HUMIDITY:                   60.00  PERCENT

      SAMPLE LINE:  TEMPERATURE, DEGREES C:  160.00,  FLOW RATE, LITERS/MIN:    5.00

      SAMPLE LINE TRANSPORT TIME, SEC:    5.00

  NUMBER OF TESTS:   5

  COMMENTS:

   NO ENGINE OPERATIONAL DATA
  CI-7 ADDITIVE USED ON RUNS 1 AND 2
   HIGH PROBE BUFFET AT 5000 # THRUST, CRACKED SUPPORT ROLLED
   PROBE SUPPORT FAILED ON LAST RUN


                                                                                                            TURBINE
                                                 ENGINE         MEASURED   GAS GEN      CALC   COMPRESSOR    ENGINE     INLET
  CLOCK      TEST           POWER                 SPEED           FUEL     AIR FLOW     F/A    DISCHARGE    PRESSURE     TEMP
  TIME       MODE     THRUST,LBS  PERCENT          RPM            FLOW     LB/SEC                 TEMP        RATIO    DEGREES F
                          OR       RATED                          LB/HR                        DEGREES F       EPR
                          SHP       T.O.      N1         N2
                                                                                                                          -0.00
                                                                                              -0.00         -0.00         -0.00
   -0.00     4/ 0       -0.00        0       -0.00      -0.00     -0.00      -0.00  -0.000000    -0.00         -0.00         -0.00
   -0.00     5/ 4       -0.00        0       -0.00      -0.00     -0.00      -0.00  -0.000000    -0.00         -0.00         -0.00
   -0.00     5/ 5       -0.00        0       -0.00      -0.00     -0.00      -0.00  -0.000000    -0.00         -0.00         -0.00
   -0.00     4/ 5       -0.00        0       -0.00      -0.00     -0.00      -0.00  -0.000000    -0.00         -0.00
   -0.00     1/ 4       -0.00        0       -0.00      -0.00     -0.00      -0.00  -0.000000


                                                                   NO         NO        NO     ALDEHYDES   SMOKE   PARTICULATES
  POWER     EXHAUST      EXHAUST         CO         CO       THC        NO          2         X
 PERCENT     GAS           GAS          (WET)        2      (WET)      (WET)     (WET)     (WET)
  RATED      TEMP       PRESSURE        PPMV      (WET)     PPMV       PPMV      PPMV      PPMV
  T.O.    DEGREES F       PSIA                  PERCENT V

                                                                                             8.00    -0.00      -0.00       -0.00
    0        -0.00        -0.00       660.00      1.35   1200.00       8.00     -0.00      36.00    -0.00      -0.00       -0.00
    0        -0.00        -0.00       100.00      2.00     30.00      35.60     -0.00      46.00    -0.00      -0.00       -0.00
    0        -0.00        -0.00        90.00      1.95      9.00      44.00     -0.00       9.00    -0.00      -0.00       -0.00
    0        -0.00        -0.00       560.00      1.10   1200.00       6.00     -0.00      60.00    -0.00      -0.00       -0.00
    0        -0.00        -0.00        70.00      2.25      4.50      56.00     -0.00
```

TABLE V

TURBINE/TURBOPROP ENGINES

(WEIGHTED PROCESSING)

CONTENTS:

V-2 TO V-14 MODEL SUMMARIES

```
MODEL  T56-A7 TURBOPROP      SAMPLE NUMBER =  11.


MODE                 EMISSION     FUEL      TIME IN      CO        FUEL      LB CO /     ENERGY     LB CO /
                       RATE       RATE       MODE       MASS       MASS    1K LB FUEL    HP-HR       HP-HR
                      LB/HR      LB/HR       MIN.       LBS.       LBS.

TAXI-IDLE  MEAN       5.013     636.717     19.00      0.794     201.63       7.854      71.34     0.01112
           STD DEV    2.968      15.761      0.0       0.470       4.98       4.590       0.13     0.00659

TAKEOFF    MEAN       2.150    2079.317      0.50      0.018      17.33       1.040      31.29     0.00057
           STD DEV    1.285      77.480      0.0       0.011       0.65       0.627       0.03     0.00034

CLIMBOUT   MEAN       3.009    1908.447      2.50      0.125      79.52       1.579     140.81     0.00089
           STD DEV    0.791      25.675      0.0       0.033       1.08       0.421       0.18     0.00023

APPROACH   MEAN       3.668    1052.900      4.50      0.275      78.97       3.482      84.49     0.00326
           STD DEV    0.841      23.937      0.0       0.063       1.79       0.787       0.14     0.00075

TAXI-IDLE  MEAN       5.013     636.717      7.00      0.292      74.28       7.854      26.28     0.01112
           STD DEV    2.968      15.761      0.0       0.173       1.84       4.590       0.0      0.00659

         TOTAL FOR CYCLE                    MEAN:      1.504     451.72                 354.22
                                         STD DEV:      0.675       7.42                   0.0

         LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:      3.329
                                         STD DEV:      1.488

         LBS POLLUTANT/1K HP-HR/CYCLE       MEAN:      4.247
                                         STD DEV:      1.907

         LBS POLLUTANT/1000K HP-HR AT T.O.  MEAN:      0.477
                                         STD DEV:      0.285


MODE                 EMISSION     FUEL      TIME IN      HC        FUEL      LB HC /     ENERGY     LB HC /
                       RATE       RATE       MODE       MASS       MASS    1K LB FUEL    HP-HR       HP-HR
                      LB/HR      LB/HR       MIN.       LBS.       LBS.

TAXI-IDLE  MEAN       1.462     636.717     19.00      0.232     201.63       2.298      71.34     0.00325
           STD DEV    1.315      15.761      0.0       0.208       4.98       2.056       0.13     0.00292

TAKEOFF    MEAN       0.430    2079.317      0.50      0.004      17.33       0.207      31.29     0.00011
           STD DEV    0.911      77.480      0.0       0.008       0.65       0.438       0.03     0.00024

CLIMBOUT   MEAN       0.476    1908.447      2.50      0.020      79.52       0.250     140.81     0.00014
           STD DEV    0.976      25.675      0.0       0.041       1.08       0.512       0.18     0.00029

APPROACH   MEAN       0.517    1052.900      4.50      0.039      78.97       0.491      84.49     0.00046
           STD DEV    1.004      23.937      0.0       0.075       1.79       0.952       0.14     0.00089

TAXI-IDLE  MEAN       1.462     636.717      7.00      0.085      74.28       2.298      26.28     0.00325
           STD DEV    1.315      15.761      0.0       0.077       1.84       2.056       0.0      0.00292

         TOTAL FOR CYCLE                    MEAN:      0.379     451.72                 354.22
                                         STD DEV:      0.359       7.42                   0.0

         LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:      0.842
                                         STD DEV:      0.799

         LBS POLLUTANT/1K HP-HR/CYCLE       MEAN:      1.070
                                         STD DEV:      1.014

         LBS POLLUTANT/1000K HP-HR AT T.O.  MEAN:      0.955
                                         STD DEV:      2.021


MODE                 EMISSION     FUEL      TIME IN      NOX       FUEL      LB NOX/     ENERGY     LB NOX/
                       RATE       RATE       MODE       MASS       MASS    1K LB FUEL    HP-HR       HP-HR
                      LB/HR      LB/HR       MIN.       LBS.       LBS.

TAXI-IDLE  MEAN       3.343     636.717     19.00      0.529     201.63       5.245      71.34     0.00742
           STD DEV    0.357      15.761      0.0       0.056       4.98       0.488       0.13     0.00079

TAKEOFF    MEAN      22.878    2079.317      0.50      0.191      17.33      10.984      31.29     0.00609
           STD DEV    3.566      77.480      0.0       0.030       0.65       1.501       0.03     0.00095

CLIMBOUT   MEAN      21.212    1908.447      2.50      0.884      79.52      11.111     140.81     0.00628
           STD DEV    2.314      25.675      0.0       0.096       1.08       1.154       0.18     0.00068

APPROACH   MEAN       7.776    1052.900      4.50      0.583      78.97       7.382      84.49     0.00690
           STD DEV    0.913      23.937      0.0       0.068       1.79       0.812       0.14     0.00081

TAXI-IDLE  MEAN       3.343     636.717      7.00      0.195      74.28       5.245      26.28     0.00742
           STD DEV    0.357      15.761      0.0       0.021       1.84       0.488       0.0      0.00079

         TOTAL FOR CYCLE                    MEAN:      2.382     451.72                 354.22
                                         STD DEV:      0.232       7.42                   0.0

         LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:      5.269
                                         STD DEV:      0.454

         LBS POLLUTANT/1K HP-HR/CYCLE       MEAN:      6.725
                                         STD DEV:      0.654

         LBS POLLUTANT/1000K HP-HR AT T.O.  MEAN:     50.773
                                         STD DEV:      7.914
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MODEL  T56-A15 TURBOPROP     SAMPLE NUMBER =  12.

MODE                     EMISSION     FUEL       TIME IN      CO        FUEL       LB CO /      ENERGY      LB CO /
                           RATE       RATE        MODE       MASS       MASS      1K LB FUEL    HP-HR        HP-HR
                          LB/HR       LB/HR       MIN.       LBS.       LBS.

TAXI-IDLE   MEAN          4.896      677.688     19.00      0.775     214.60       7.221       87.23      0.00889
            STD DEV       0.855       67.967      0.0       0.135      21.52       0.992        0.13      0.00155
TAKEOFF     MEAN          3.765     2392.661      0.50      0.031      19.94       1.565       38.26      0.00082
            STD DEV       1.293      124.766      0.0       0.011       1.04       0.491        0.05      0.00028
CLIMBOUT    MEAN          3.404     2188.467      2.50      0.142      91.19       1.549      172.16      0.00082
            STD DEV       0.801       95.255      0.0       0.033       3.97       0.317        0.08      0.00019
APPROACH    MEAN          3.489     1145.895      4.50      0.262      85.94       3.044      103.30      0.00253
            STD DEV       0.848       19.792      0.0       0.064       1.48       0.731        0.15      0.00062
TAXI-IDLE   MEAN          4.896      677.688      7.00      0.286      79.06       7.221       32.14      0.00889
            STD DEV       0.855       67.967      0.0       0.050       7.93       0.992        0.0       0.00155
                                                MEAN:     1.496     490.73                   433.08
            TOTAL FOR CYCLE                  STD DEV:     0.214      30.21                     0.43

                                                MEAN:     3.045
            LBS POLLUTANT/1K LB FUEL/CYCLE   STD DEV:     0.372

                                                MEAN:     3.454
            LBS POLLUTANT/1K HP-HR/CYCLE     STD DEV:     0.494

                                                MEAN:     0.683
            LBS POLLUTANT/1000K HP-HR AT T.O. STD DEV:    0.235


MODE                     EMISSION     FUEL       TIME IN      HC        FUEL       LB HC /      ENERGY      LB HC /
                           RATE       RATE        MODE       MASS       MASS      1K LB FUEL    HP-HR        HP-HR
                          LB/HR       LB/HR       MIN.       LBS.       LBS.

TAXI-IDLE   MEAN          1.158      677.688     19.00      0.183     214.60       1.687       87.23      0.00210
            STD DEV       1.424       67.967      0.0       0.225      21.52       2.037        0.13      0.00258
TAKEOFF     MEAN          0.440     2392.661      0.50      0.004      19.94       0.179       38.26      0.00010
            STD DEV       0.666      124.766      0.0       0.006       1.04       0.272        0.05      0.00015
CLIMBOUT    MEAN          0.399     2188.467      2.50      0.017      91.19       0.179      172.16      0.00010
            STD DEV       0.590       95.255      0.0       0.025       3.97       0.267        0.08      0.00014
APPROACH    MEAN          0.326     1145.895      4.50      0.024      85.94       0.286      103.30      0.00024
            STD DEV       0.321       19.792      0.0       0.024       1.48       0.281        0.15      0.00023
TAXI-IDLE   MEAN          1.158      677.688      7.00      0.068      79.06       1.687       32.14      0.00210
            STD DEV       1.424       67.967      0.0       0.083       7.93       2.037        0.0       0.00258
                                                MEAN:     0.296     490.73                   433.08
            TOTAL FOR CYCLE                  STD DEV:     0.331      30.21                     0.43

                                                MEAN:     0.592
            LBS POLLUTANT/1K LB FUEL/CYCLE   STD DEV:     0.642

                                                MEAN:     0.683
            LBS POLLUTANT/1K HP-HR/CYCLE     STD DEV:     0.765

                                                MEAN:     0.798
            LBS POLLUTANT/1000K HP-HR AT T.O. STD DEV:    1.210


MODE                     EMISSION     FUEL       TIME IN      NOX       FUEL       LB NOX/      ENERGY      LB NOX/
                           RATE       RATE        MODE       MASS       MASS      1K LB FUEL    HP-HR        HP-HR
                          LB/HR       LB/HR       MIN.       LBS.       LBS.

TAXI-IDLE   MEAN          2.886      677.688     19.00      0.457     214.60       4.181       87.23      0.00524
            STD DEV       1.654       67.967      0.0       0.262      21.52       2.175        0.13      0.00300
TAKEOFF     MEAN         27.898     2392.661      0.50      0.232      19.94      11.655       38.26      0.00608
            STD DEV      11.532      124.766      0.0       0.096       1.04       4.769        0.05      0.00251
CLIMBOUT    MEAN         22.201     2188.467      2.50      0.925      91.19      10.141      172.16      0.00537
            STD DEV       3.532       95.255      0.0       0.147       3.97       1.550        0.08      0.00085
APPROACH    MEAN          7.323     1145.895      4.50      0.549      85.94       6.384      103.30      0.00532
            STD DEV       1.570       19.792      0.0       0.118       1.48       1.324        0.15      0.00114
TAXI-IDLE   MEAN          2.886      677.688      7.00      0.168      79.06       4.181       32.14      0.00524
            STD DEV       1.654       67.967      0.0       0.096       7.93       2.175        0.0       0.00300
                                                MEAN:     2.332     490.73                   433.08
            TOTAL FOR CYCLE                  STD DEV:     0.605      30.21                     0.43

                                                MEAN:     4.723
            LBS POLLUTANT/1K LB FUEL/CYCLE   STD DEV:     1.038

                                                MEAN:     5.395
            LBS POLLUTANT/1K HP-HR/CYCLE     STD DEV:     1.396

                                                MEAN:    50.639
            LBS POLLUTANT/1000K HP-HR AT T.O. STD DEV:   20.932
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MODEL  TPF-331 TURBOPROP     SAMPLE NUMBER =   3.

MODE                 EMISSION     FUEL      TIME IN      CO        FUEL       LB CO /     ENERGY     LB CO /
                       RATE       RATE       MODE       MASS       MASS      1K LB FUEL    HP-HR      HP-HR
                       LB/HR      LB/HR      MIN.       LBS.       LBS.

TAXI-IDLE   MEAN       3.249     162.770     19.00      0.514      51.54      20.002      22.23     0.02316
            STD DEV    0.286      11.581     0.0        0.045       3.67       1.848       0.33     0.00240

TAKEOFF     MEAN       0.393     365.419     0.50       0.003       3.05       1.082       4.87     0.00067
            STD DEV    0.309       9.366     0.0        0.003       0.08       0.848       0.07     0.00052

CLIMBOUT    MEAN       0.568     339.093     2.50       0.024      14.13       1.684      21.94     0.00107
            STD DEV    0.313      10.361     0.0        0.013       0.43       0.936       0.32     0.00058

APPROACH    MEAN       2.582     206.096     4.50       0.194      15.46      12.537      13.16     0.01469
            STD DEV    0.443       7.348     0.0        0.033       0.55       2.145       0.19     0.00235

TAXI-IDLE   MEAN       3.249     162.770     7.00       0.190      18.99      20.002       8.19     0.02316
            STD DEV    0.286      11.581     0.0        0.017       1.35       1.848       0.12     0.00240

            TOTAL FOR CYCLE                     MEAN:   0.924     103.16                  70.39
                                            STD DEV:    0.032       5.95                   1.04

            LBS POLLUTANT/1K LB FUEL/CYCLE      MEAN:   8.969
                                            STD DEV:    0.241

            LBS POLLUTANT/1K HP-HR/CYCLE        MEAN:  13.137
                                            STD DEV:    0.601

            LBS POLLUTANT/1000K HP-HR AT T.O.   MEAN:   0.556
                                            STD DEV:    0.435

MODE                 EMISSION     FUEL      TIME IN      HC        FUEL       LB HC /     ENERGY     LB HC /
                       RATE       RATE       MODE       MASS       MASS      1K LB FUEL    HP-HR      HP-HR
                       LB/HR      LB/HR      MIN.       LBS.       LBS.

TAXI-IDLE   MEAN       0.586     162.770     19.00      0.093      51.54       3.640      22.23     0.00418
            STD DEV    0.226      11.581     0.0        0.036       3.67       1.470       0.33     0.00166

TAKEOFF     MEAN       0.055     365.419     0.50       0.000       3.05       0.153       4.87     0.00009
            STD DEV    0.062       9.366     0.0        0.001       0.08       0.175       0.07     0.00011

CLIMBOUT    MEAN       0.053     339.093     2.50       0.002      14.13       0.158      21.94     0.00010
            STD DEV    0.060      10.361     0.0        0.003       0.43       0.184       0.32     0.00011

APPROACH    MEAN       0.240     206.096     4.50       0.018      15.46       1.177      13.16     0.00136
            STD DEV    0.125       7.348     0.0        0.009       0.55       0.643       0.19     0.00070

TAXI-IDLE   MEAN       0.586     162.770     7.00       0.034      18.99       3.640       8.19     0.00418
            STD DEV    0.226      11.581     0.0        0.013       1.35       1.470       0.12     0.00166

            TOTAL FOR CYCLE                     MEAN:   0.148     103.16                  70.39
                                            STD DEV:    0.048       5.95                   1.04

            LBS POLLUTANT/1K LB FUEL/CYCLE      MEAN:   1.444
                                            STD DEV:    0.507

            LBS POLLUTANT/1K HP-HR/CYCLE        MEAN:   2.100
                                            STD DEV:    0.695

            LBS POLLUTANT/1000K HP-HR AT T.O.   MEAN:   0.783
                                            STD DEV:    0.877

MODE                 EMISSION     FUEL      TIME IN      NOX       FUEL       LB NOX/     ENERGY     LB NOX/
                       RATE       RATE       MODE       MASS       MASS      1K LB FUEL    HP-HR      HP-HR
                       LB/HR      LB/HR      MIN.       LBS.       LBS.

TAXI-IDLE   MEAN       1.179     162.770     19.00      0.187      51.54       7.149      22.23     0.00841
            STD DEV    0.393      11.581     0.0        0.062       3.67       1.976       0.33     0.00283

TAKEOFF     MEAN       3.639     365.419     0.50       0.030       3.05       9.902       4.87     0.00624
            STD DEV    1.276       9.366     0.0        0.011       0.08       3.263       0.07     0.00226

CLIMBOUT    MEAN       3.313     339.093     2.50       0.138      14.13       9.706      21.94     0.00631
            STD DEV    1.191      10.361     0.0        0.050       0.43       3.245       0.32     0.00234

APPROACH    MEAN       1.685     206.096     4.50       0.126      15.46       8.113      13.16     0.00962
            STD DEV    0.593       7.348     0.0        0.044       0.55       2.641       0.19     0.00347

TAXI-IDLE   MEAN       1.179     162.770     7.00       0.069      18.99       7.149       8.19     0.00841
            STD DEV    0.393      11.581     0.0        0.023       1.35       1.976       0.12     0.00283

            TOTAL FOR CYCLE                     MEAN:   0.550     103.16                  70.39
                                            STD DEV:    0.185       5.95                   1.04

            LBS POLLUTANT/1K LB FUEL/CYCLE      MEAN:   5.275
                                            STD DEV:    1.546

            LBS POLLUTANT/1K HP-HR/CYCLE        MEAN:   7.831
                                            STD DEV:    2.682

            LBS POLLUTANT/1000K HP-HR AT T.O.   MEAN:  51.975
                                            STD DEV:   18.794
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MODEL  CJ805                SAMPLE NUMBER =   8.

MODE                EMISSION     FUEL       TIME IN       CO         FUEL       LB CO /      ENERGY      LB CO /
                      RATE       RATE        MODE        MASS        MASS     1K LB FUEL    # TH-HR     # TH-HR
                     LB/HR       LB/HR       MIN.        LBS.        LBS.

                                                                     430.17       45.150      283.73     0.03418
TAXI-IDLE  MEAN      61.252     1358.432     19.00       9.698        25.48        8.210        0.0      0.00612
           STD DEV   10.965       80.474      0.0        1.736
                                                                     116.20        2.921      130.67     0.00260
TAKEOFF    MEAN      29.071     9959.773      0.70       0.339         2.93        0.437        0.13     0.00038
           STD DEV    4.213      251.241      0.0        0.049
                                                                     303.98        3.488      349.07     0.00303
CLIMBOUT   MEAN      28.876     8290.375      2.20       1.059         6.67        0.584        0.0      0.00048
           STD DEV    4.592      181.826      0.0        0.168
                                                                     251.77       11.509      298.67     0.00956
APPROACH   MEAN      42.825     3776.597      4.00       2.855        20.95        4.613        0.0      0.00324
           STD DEV   14.524      314.310      0.0        0.968
                                                                     158.48       45.150      104.53     0.03418
TAXI-IDLE  MEAN      61.252     1358.432      7.00       3.573         9.39        8.210        0.09     0.00612
           STD DEV   10.965       80.474      0.0        0.640
                                                                                             1166.66
           TOTAL FOR CYCLE                        MEAN:  17.524     1260.60                     1.81
                                               STD DEV:   3.140       51.81

           LBS POLLUTANT/1K LB FUEL/CYCLE         MEAN:  13.923
                                               STD DEV:   2.622

           LBS POLLUTANT/1K LB TH-HR/CYCLE        MEAN:  15.021
                                               STD DEV:   2.692

           LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:   3.028
                                               STD DEV:   0.439


MODE                EMISSION     FUEL       TIME IN       HC         FUEL       LB HC /      ENERGY      LB HC /
                      RATE       RATE        MODE        MASS        MASS     1K LB FUEL    # TH-HR     # TH-HR
                     LB/HR       LB/HR       MIN.        LBS.        LBS.

                                                         2.442       430.17       11.306      283.73     0.00861
TAXI-IDLE  MEAN      15.426     1358.432     19.00       1.043        25.48        4.718        0.0      0.00368
           STD DEV    6.589       80.474      0.0
                                                         0.006       116.20        0.056      130.67     0.00005
TAKEOFF    MEAN       0.556     9959.773      0.70       0.006         2.93        0.054        0.13     0.00005
           STD DEV    0.547      251.241      0.0
                                                         0.021       303.98        0.070      349.07     0.00006
CLIMBOUT   MEAN       0.583     8290.375      2.20       0.016         6.67        0.053        0.0      0.00005
           STD DEV    0.442      181.826      0.0
                                                         0.162       251.77        0.645      298.67     0.00054
APPROACH   MEAN       2.427     3776.597      4.00       0.125        20.95        0.493        0.0      0.00042
           STD DEV    1.882      314.310      0.0
                                                         0.900       158.48       11.306      104.53     0.00861
TAXI-IDLE  MEAN      15.426     1358.432      7.00       0.384         9.39        4.718        0.09     0.00368
           STD DEV    6.589       80.474      0.0
                                                                                             1166.66
           TOTAL FOR CYCLE                        MEAN:   3.532     1260.60                     1.81
                                               STD DEV:   1.520       51.81

           LBS POLLUTANT/1K LB FUEL/CYCLE         MEAN:   2.794
                                               STD DEV:   1.185

           LBS POLLUTANT/1K LB TH-HR/CYCLE        MEAN:   3.027
                                               STD DEV:   1.303

           LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:   0.579
                                               STD DEV:   0.570


MODE                EMISSION     FUEL       TIME IN       NOX        FUEL       LB NOX/      ENERGY      LB NOX/
                      RATE       RATE        MODE        MASS        MASS     1K LB FUEL    # TH-HR     # TH-HR
                     LB/HR       LB/HR       MIN.        LBS.        LBS.

                                                                     430.17        2.072      283.73     0.00157
TAXI-IDLE  MEAN       2.822     1358.432     19.00       0.447        25.48        0.181        0.0      0.00021
           STD DEV    0.374       80.474      0.0        0.059
                                                                     116.20       11.086      130.67     0.00988
TAKEOFF    MEAN     110.632     9959.773      0.70       1.291         2.93        1.565        0.13     0.00158
           STD DEV   17.743      251.241      0.0        0.207
                                                                     303.98        8.917      349.07     0.00777
CLIMBOUT   MEAN      73.982     8290.375      2.20       2.713         6.67        0.600        0.0      0.00064
           STD DEV    6.115      181.826      0.0        0.224
                                                                     251.77        4.739      298.67     0.00398
APPROACH   MEAN      17.845     3776.597      4.00       1.190        20.95        0.336        0.0      0.00030
           STD DEV    1.362      314.310      0.0        0.091
                                                                     158.48        2.072      104.53     0.00157
TAXI-IDLE  MEAN       2.822     1358.432      7.00       0.165         9.39        0.181        0.09     0.00021
           STD DEV    0.374       80.474      0.0        0.022
                                                                                             1166.66
           TOTAL FOR CYCLE                        MEAN:   5.804     1260.60                     1.81
                                               STD DEV:   0.334       51.81

           LBS POLLUTANT/1K LB FUEL/CYCLE         MEAN:   4.610
                                               STD DEV:   0.301

           LBS POLLUTANT/1K LB TH-HR/CYCLE        MEAN:   4.975
                                               STD DEV:   0.286

           LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN: 115.242
                                               STD DEV:  18.482
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MODEL  JT3C                    SAMPLE NUMBER =   7.

MODE                EMISSION    FUEL       TIME IN     CO        FUEL       LB CO /     ENERGY     LB CO /
                      RATE      RATE        MODE      MASS       MASS      1K LB FUEL   # TH-HR    # TH-HR
                     LB/HR      LB/HR       MIN.      LBS.       LBS.

TAXI-IDLE  MEAN      79.964    1613.686     19.00    12.661     511.00      50.073     375.48     0.03368
           STD DEV   42.603      85.354      0.0      6.745      27.02      26.690      11.97     0.01765

TAKEOFF    MEAN       9.036   10183.211      0.70     0.105     118.80       0.879     138.33     0.00076
           STD DEV    7.896     413.273      0.0      0.092       4.82       0.756       4.41     0.00066

CLIMBOUT   MEAN      15.957    8509.188      2.20     0.585     312.00       1.873     369.55     0.00158
           STD DEV    8.429     342.477      0.0      0.309      12.56       0.972      11.78     0.00082

APPROACH   MEAN      49.015    4115.418      4.00     3.268     274.36      12.199     316.19     0.01030
           STD DEV   23.793     245.341      0.0      1.586      16.36       6.355      10.08     0.00489

TAXI-IDLE  MEAN      79.964    1613.686      7.00     4.665     188.26      50.073     138.33     0.03368
           STD DEV   42.603      85.354      0.0      2.485       9.96      26.690       4.41     0.01765

        TOTAL FOR CYCLE                    MEAN:   21.284    1404.43                 1337.88
                                        STD DEV:   10.969      57.76                   42.69

        LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:   15.309
                                        STD DEV:    7.957

        LBS POLLUTANT/1K LB TH-HR/CYCLE    MEAN:   15.882
                                        STD DEV:    8.038

        LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:    0.882
                                            STD DEV:    0.764


MODE                EMISSION    FUEL       TIME IN     HC        FUEL       LB HC /     ENERGY     LB HC /
                      RATE      RATE        MODE      MASS       MASS      1K LB FUEL   # TH-HR    # TH-HR
                     LB/HR      LB/HR       MIN.      LBS.       LBS.

TAXI-IDLE  MEAN      34.294    1613.686     19.00     5.430     511.00      21.355     375.48     0.01438
           STD DEV   34.950      85.354      0.0      5.534      27.02      21.049      11.97     0.01451

TAKEOFF    MEAN       0.855   10183.211      0.70     0.010     118.80       0.086     138.33     0.00007
           STD DEV    1.346     413.273      0.0      0.016       4.82       0.135       4.41     0.00012

CLIMBOUT   MEAN     · 0.893    8509.188      2.20     0.033     312.00       0.106     369.55     0.00009
           STD DEV    0.598     342.477      0.0      0.022      12.56       0.071      11.78     0.00006

APPROACH   MEAN       8.261    4115.418      4.00     0.551     274.36       2.018     316.19     0.00173
           STD DEV    6.687     245.341      0.0      0.446      16.36       1.626      10.08     0.00139

TAXI-IDLE  MEAN      34.294    1613.686      7.00     2.001     188.26      21.355     138.33     0.01438
           STD DEV   34.950      85.354      0.0      2.039       9.96      21.049       4.41     0.01451

        TOTAL FOR CYCLE                    MEAN:    8.024    1404.43                 1337.88
                                        STD DEV:    7.979      57.76                   42.69

        LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:    5.735
                                        STD DEV:    5.565

        LBS POLLUTANT/1K LB TH-HR/CYCLE    MEAN:    5.964
                                        STD DEV:    5.871

        LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:    0.864
                                            STD DEV:    1.362


MODE                EMISSION    FUEL       TIME IN     NOX       FUEL       LB NOX/     ENERGY     LB NOX/
                      RATE      RATE        MODE      MASS       MASS      1K LB FUEL   # TH-HR    # TH-HR
                     LB/HR      LB/HR       MIN.      LBS.       LBS.

TAXI-IDLE  MEAN       4.168    1613.686     19.00     0.660     511.00       2.596     375.48     0.00176
           STD DEV    0.764      85.354      0.0      0.121      27.02       0.530      11.97     0.00030

TAKEOFF    MEAN     119.008   10183.211      0.70     1.388     118.80      11.637     138.33     0.01000
           STD DEV   25.788     413.273      0.0      0.301       4.82       2.240       4.41     0.00201

CLIMBOUT   MEAN      84.675    8509.188      2.20     3.105     312.00       9.929     369.55     0.00839
           STD DEV   13.642     342.477      0.0      0.500      12.56       1.398      11.78     0.00122

APPROACH   MEAN      23.212    4115.418      4.00     1.547     274.36       5.654     316.19     0.00490
           STD DEV    2.698     245.341      0.0      0.180      16.36       0.734      10.08     0.00061

TAXI-IDLE  MEAN       4.168    1613.686      7.00     0.243     188.26       2.596     138.33     0.00176
           STD DEV    0.764      85.354      0.0      0.045       9.96       0.530       4.41     0.00030

        TOTAL FOR CYCLE                    MEAN:    6.944    1404.43                 1337.88
                                        STD DEV:    0.970      57.76                   42.69

        LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:    4.953
                                        STD DEV:    0.750

        LBS POLLUTANT/1K LB TH-HR/CYCLE    MEAN:    5.183
                                        STD DEV:    0.649

        LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:  116.722
                                            STD DEV:   23.396
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MODEL  JT3D                SAMPLE NUMBER =  26.

MODE                  EMISSION     FUEL       TIME IN       CO         FUEL      LB CO /     ENERGY     LB CO /
                        RATE       RATE        MODE        MASS        MASS    1K LB FUEL   # TH-HR    # TH-HR
                       LB/HR      LB/HR        MIN.        LBS.        LBS.

TAXI-IDLE   MEAN      68.835     1379.321      19.00      10.899      436.78     48.865      585.83    0.01855
            STD DEV   37.515      241.812      0.0         5.940       76.58     22.791       36.14    0.01007

TAKEOFF     MEAN      12.269    10835.289      0.70        0.143      126.41      1.137      215.83    0.00066
            STD DEV    8.507      821.060      0.0         0.099        9.58      0.781       13.32    0.00045

CLIMBOUT    MEAN      15.303     8955.805      2.20        0.561      328.38      1.735      576.58    0.00098
            STD DEV    7.927      662.439      0.0         0.291       24.29      0.940       35.57    0.00052

APPROACH    MEAN      39.678     4137.551      4.00        2.645      275.84      9.634      493.33    0.00539
            STD DEV   19.986      350.089      0.0         1.332       23.34      4.850       30.43    0.00280

TAXI-IDLE   MEAN      68.835     1379.321      7.00        4.015      160.92     48.865      215.83    0.01855
            STD DEV   37.515      241.812      0.0         2.188       28.21     22.791       13.32    0.01007

         TOTAL FOR CYCLE                          MEAN:   18.264     1328.33                2087.41
                                              STD DEV:     8.963      138.11                 128.65

         LBS POLLUTANT/1K LB FUEL/CYCLE            MEAN:   13.548
                                              STD DEV:     6.031

         LBS POLLUTANT/1K LB TH-HR/CYCLE           MEAN:    8.734
                                              STD DEV:     4.290

         LBS POLLUTANT/1000K LB TH-HR AT T.O.      MEAN:    0.768
                                              STD DEV:     0.522


MODE                  EMISSION     FUEL       TIME IN       HC         FUEL      LB HC /     ENERGY     LB HC /
                        RATE       RATE        MODE        MASS        MASS    1K LB FUEL   # TH-HR    # TH-HR
                       LB/HR      LB/HR        MIN.        LBS.        LBS.

TAXI-IDLE   MEAN      41.225     1379.321      19.00       6.527      436.78     30.301      585.83    0.01113
            STD DEV   28.748      241.812      0.0         4.552       76.58     20.478       36.14    0.00773

TAKFOFF     MEAN       4.654    10835.289      0.70        0.054      126.41      0.416      215.83    0.00025
            STD DEV    8.731      821.060      0.0         0.102        9.58      0.783       13.32    0.00048

CLIMBOUT    MEAN       4.915     8955.805      2.20        0.180      328.38      0.536      576.58    0.00031
            STD DEV    8.419      662.439      0.0         0.309       24.29      0.912       35.57    0.00055

APPROACH    MEAN       7.842     4137.551      4.00        0.523      275.84      1.884      493.33    0.00107
            STD DEV    6.332      350.089      0.0         0.422       23.34      1.491       30.43    0.00089

TAXI-IDLE   MEAN      41.225     1379.321      7.00        2.405      160.92     30.301      215.83    0.01113
            STD DEV   28.748      241.812      0.0         1.677       28.21     20.478       13.32    0.00773

         TOTAL FOR CYCLE                          MEAN:    9.689     1328.33                2087.41
                                              STD DEV:     6.206      138.11                 128.65

         LBS POLLUTANT/1K LB FUEL/CYCLE            MEAN:    7.256
                                              STD DEV:     4.498

         LBS POLLUTANT/1K LB TH-HR/CYCLE           MEAN:    4.642
                                              STD DEV:     2.961

         LBS POLLUTANT/1000K LB TH-HR AT T.O.      MEAN:    2.933
                                              STD DEV:     5.627


MODE                  EMISSION     FUEL       TIME IN      NOX         FUEL      LB NOX/     ENERGY     LB NOX/
                        RATE       RATE        MODE        MASS        MASS    1K LB FUEL   # TH-HR    # TH-HR
                       LB/HR      LB/HR        MIN.        LBS.        LBS.

TAXI-IDLE   MEAN       3.208     1379.321      19.00       0.508      436.78      2.342      585.83    0.00087
            STD DEV    0.801      241.812      0.0         0.127       76.58      0.528       36.14    0.00020

TAKEOFF     MEAN     148.125    10835.289      0.70        1.728      126.41     13.613      215.83    0.00798
            STD DEV   25.842      821.060      0.0         0.301        9.58      1.656       13.32    0.00106

CLIMBOUT    MEAN      96.218     8955.805      2.20        3.528      328.38     10.720      576.58    0.00610
            STD DEV   14.259      662.439      0.0         0.523       24.29      1.097       35.57    0.00066

APPROACH    MEAN      21.784     4137.551      4.00        1.452      275.84      5.277      493.33    0.00294
            STD DEV    3.099      350.089      0.0         0.207       23.34      0.694       30.43    0.00035

TAXI-IDLE   MEAN       3.208     1379.321      7.00        0.187      160.92      2.342      215.83    0.00087
            STD DEV    0.801      241.812      0.0         0.047       28.21      0.528       13.32    0.00020

         TOTAL FOR CYCLE                          MEAN:    7.404     1328.33                2087.41
                                              STD DEV:     1.072      138.11                 128.65

         LBS POLLUTANT/1K LB FUEL/CYCLE            MEAN:    5.596
                                              STD DEV:     0.729

         LBS POLLUTANT/1K LB TH-HR/CYCLE           MEAN:    3.538
                                              STD DEV:     0.375

         LBS POLLUTANT/1000K LB TH-HR AT T.O.      MEAN:   93.083
                                              STD DEV:    12.371
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MODEL  JT4A                 SAMPLE NUMBER =   8.

MODE                EMISSION     FUEL       TIME IN      CO        FUEL        LB CO /     ENERGY      LB CO /
                      RATE       RATE        MODE       MASS       MASS      1K LB FUEL   # TH-HR     # TH-HR
                     LB/HR      LB/HR        MIN.       LBS.       LBS.

TAXI-IDLE  MEAN      45.917    2061.813     19.00      7.270      652.91       22.282      554.17     0.01312
           STD DEV   24.398     107.011      0.0       3.863       33.89       11.867        0.38     0.00697

TAKEOFF    MEAN      18.823   15511.203      0.70      0.220      180.96        1.214      204.17     0.00108
           STD DEV    3.994     427.062      0.0       0.047        4.98        0.258        0.0      0.00023

CLIMBOUT   MEAN      18.277   13066.484      2.20      0.670      479.10        1.399      545.42     0.00123
           STD DEV    3.129     240.685      0.0       0.115        8.78        0.235        0.0      0.00021

APPROACH   MEAN      26.326    5993.734      4.00      1.755      399.58        4.412      466.67     0.00376
           STD DEV    9.529     324.933      0.0       0.635       21.66        1.671        0.0      0.00136

TAXI-IDLE  MEAN      45.917    2061.813      7.00      2.678      240.54       22.282      204.17     0.01312
           STD DEV   24.398     107.011      0.0       1.423       12.49       11.867        0.0      0.00697

           TOTAL FOR CYCLE                    MEAN:   12.593     1953.10                  1974.58
                                          STD DEV:    5.922       71.33                     2.62

           LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:    6.462
                                          STD DEV:    3.067

           LBS POLLUTANT/1K LB TH-HR/CYCLE    MEAN:    6.378
                                          STD DEV:    2.999

           LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:    1.255
                                          STD DEV:    0.266

MODE                EMISSION     FUEL       TIME IN      HC        FUEL        LB HC /     ENERGY      LB HC /
                      RATE       RATE        MODE       MASS       MASS      1K LB FUEL   # TH-HR     # TH-HR
                     LB/HR      LB/HR        MIN.       LBS.       LBS.

TAXI-IDLE  MEAN      23.018    2061.813     19.00      3.645      652.91       11.183      554.17     0.00658
           STD DEV   14.995     107.011      0.0       2.374       33.89        7.427        0.38     0.00428

TAKEOFF    MEAN       0.674   15511.203      0.70      0.008      180.96        0.043      204.17     0.00004
           STD DEV    0.934     427.062      0.0       0.011        4.98        0.060        0.0      0.00005

CLIMBOUT   MEAN       1.274   13066.484      2.20      0.047      479.10        0.096      545.42     0.00009
           STD DEV    2.120     240.685      0.0       0.078        8.78        0.160        0.0      0.00014

APPROACH   MEAN       3.834    5993.734      4.00      0.256      399.58        0.646      466.67     0.00055
           STD DEV    2.383     324.933      0.0       0.159       21.66        0.413        0.0      0.00034

TAXI-IDLE  MEAN      23.018    2061.813      7.00      1.343      240.54       11.183      204.17     0.00658
           STD DEV   14.995     107.011      0.0       0.875       12.49        7.427        0.0      0.00428

           TOTAL FOR CYCLE                    MEAN:    5.297     1953.10                  1974.58
                                          STD DEV:    3.378       71.33                     2.62

           LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:    2.711
                                          STD DEV:    1.733

           LBS POLLUTANT/1K LB TH-HR/CYCLE    MEAN:    2.683
                                          STD DEV:    1.711

           LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:    0.449
                                          STD DEV:    0.623

MODE                EMISSION     FUEL       TIME IN     NOX        FUEL        LB NOX/     ENERGY      LB NOX/
                      RATE       RATE        MODE       MASS       MASS      1K LB FUEL   # TH-HR     # TH-HR
                     LB/HR      LB/HR        MIN.       LBS.       LBS.

TAXI-IDLE  MEAN       5.608    2061.813     19.00      0.888      652.91        2.714      554.17     0.00160
           STD DEV    0.754     107.011      0.0       0.119       33.89        0.270        0.38     0.00022

TAKEOFF    MEAN     236.335   15511.203      0.70      2.757      180.96       15.224      204.17     0.01350
           STD DEV   28.993     427.062      0.0       0.338        4.98        1.714        0.0      0.00166

CLIMBOUT   MEAN     155.298   13066.484      2.20      5.694      479.10       11.881      545.42     0.01044
           STD DEV    9.813     240.685      0.0       0.360        8.78        0.641        0.0      0.00066

APPROACH   MEAN      35.859    5993.734      4.00      2.391      399.58        5.976      466.67     0.00512
           STD DEV    4.203     324.933      0.0       0.280       21.66        0.526        0.0      0.00060

TAXI-IDLE  MEAN       5.608    2061.813      7.00      0.327      240.54        2.714      204.17     0.00160
           STD DEV    0.754     107.011      0.0       0.044       12.49        0.270        0.0      0.00022

           TOTAL FOR CYCLE                    MEAN:   12.057     1953.10                  1974.58
                                          STD DEV:    0.669       71.33                     2.62

           LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:    6.176
                                          STD DEV:    0.340

           LBS POLLUTANT/1K LB TH-HR/CYCLE    MEAN:    6.106
                                          STD DEV:    0.339

           LBS POLLUTANT/1000K LB TH-HR AT T.O.   MEAN:  157.557
                                          STD DEV:   19.329
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MODEL  JT8D UNDIL REGULAR    SAMPLE NUMBER =   7.

                                                                                                  LB CO /     ENERGY      LB CO /
                                                                                        FUEL     1K LB FUEL  # TH-HR     # TH-HR
 MODE                 EMISSION      FUEL        TIME IN        CO           MASS
                        RATE        RATE         MODE         MASS          LBS.
                        LB/HR       LB/HR        MIN.         LBS.
                                                                                                              399.00     0.02052
                                                                                        358.13     34.153      0.0       0.00339
TAXI-IDLE  MEAN        38.771     1130.935      19.00         8.189          21.16      4.335
           STD DEV      6.410       66.837      0.0           1.354                                163.33     0.00057
                                                                                         99.37      0.934      0.0       0.00024
TAKEOFF    MEAN         7.975     8517.727      0.70          0.093           1.94      0.388
           STD DEV      3.354      165.892      0.0           0.039                                436.33     0.00089
                                                                                        260.94      1.493      0.0       0.00037
CLIMBOUT   MEAN        10.621     7116.582      2.20          0.389           3.51      0.617
           STD DEV      4.385       95.555      0.0           0.161                                373.33     0.00320
                                                                                        229.69      5.210      0.0       0.00030
APPROACH   MEAN        17.920     3445.414      4.00          1.195          12.00      0.518
           STD DEV      1.665      180.022      0.0           0.111                                147.00     0.02052
                                                                                        131.94     34.153      0.10      0.00339
TAXI-IDLE  MEAN        38.771     1130.935      7.00          3.017           7.80      4.335
           STD DEV      6.410       66.837      0.0           0.499                               1519.00
                                                                                       1080.08                  2.35
           TOTAL FOR CYCLE                           MEAN:   12.883            30.02
                                                  STD DEV:    2.020

           LBS POLLUTANT/1K LB FUEL/CYCLE            MEAN:   11.905
                                                  STD DEV:    1.659

           LBS POLLUTANT/1K LB TH-HR/CYCLE           MEAN:    8.481
                                                  STD DEV:    1.330

           LBS POLLUTANT/1000K LB TH-HR AT T.O.      MEAN:    0.665
                                                  STD DEV:    0.279


                                                                                                  LB HC /     ENERGY      LB HC /
                                                                                        FUEL     1K LB FUEL  # TH-HR     # TH-HR
 MODE                 EMISSION      FUEL        TIME IN        HC           MASS
                        RATE        RATE         MODE         MASS          LBS.
                        LB/HR       LB/HR        MIN.         LBS.
                                                                                                              399.00     0.00328
                                                                                        358.13      5.515      0.0       0.00080
TAXI-IDLE  MEAN         6.199     1130.935      19.00         1.309          21.16      1.449
           STD DEV      1.506       66.837      0.0           0.318                                163.33     0.00003
                                                                                         99.37      0.043      0.0       0.00004
TAKEOFF    MEAN         0.373     8517.727      0.70          0.004           1.94      0.066
           STD DEV      0.563      165.892      0.0           0.007                                436.33     0.00003
                                                                                        260.94      0.044      0.0       0.00004
CLIMBOUT   MEAN         0.313     7116.582      2.20          0.011           3.51      0.065
           STD DEV      0.459       95.555      0.0           0.017                                373.33     0.00021
                                                                                        229.69      0.332      0.0       0.00024
APPROACH   MEAN         1.179     3445.414      4.00          0.079          12.00      0.368
           STD DEV      1.372      180.022      0.0           0.091                                147.00     0.00328
                                                                                        131.94      5.515      0.10      0.00080
TAXI-IDLE  MEAN         6.199     1130.935      7.00          0.482           7.80      1.449
           STD DEV      1.506       66.837      0.0           0.117                               1519.00
                                                                                       1080.08                  2.35
           TOTAL FOR CYCLE                           MEAN:    1.886            30.02
                                                  STD DEV:    0.444

           LBS POLLUTANT/1K LB FUEL/CYCLE            MEAN:    1.751
                                                  STD DEV:    0.432

           LBS POLLUTANT/1K LB TH-HR/CYCLE           MEAN:    1.242
                                                  STD DEV:    0.292

           LBS POLLUTANT/1000K LB TH-HR AT T.O.      MEAN:    0.311
                                                  STD DEV:    0.469


                                                                                                  LB NOX/     ENERGY      LB NOX/
                                                                                        FUEL     1K LB FUEL  # TH-HR     # TH-HR
 MODE                 EMISSION      FUEL        TIME IN        NOX          MASS
                        RATE        RATE         MODE         MASS          LBS.
                        LB/HR       LB/HR        MIN.         LBS.
                                                                                                              399.00     0.00157
                                                                                        358.13      2.624      0.0       0.00018
TAXI-IDLE  MEAN         2.958     1130.935      19.00         0.625          21.16      0.352
           STD DEV      0.349       66.837      0.0           0.074                                163.33     0.00726
                                                                                         99.37     11.930      0.0       0.00103
TAKEOFF    MEAN       101.636     8517.727      0.70          1.186           1.94      1.644
           STD DEV     14.360      165.892      0.0           0.168                                436.33     0.00569
                                                                                        260.94      9.517      0.0       0.00095
CLIMBOUT   MEAN        67.746     7116.582      2.20          2.484           3.51      1.559
           STD DEV     11.251       95.555      0.0           0.413                                373.33     0.00303
                                                                                        229.69      4.959      0.0       0.00051
APPROACH   MEAN        16.952     3445.414      4.00          1.130          12.00      1.097
           STD DEV      2.870      130.022      0.0           0.191                                147.00     0.00157
                                                                                        131.94      2.624      0.10      0.00018
TAXI-IDLE  MEAN         2.958     1130.935      7.00          0.230           7.80      0.352
           STD DEV      0.349       66.837      0.0           0.027                               1519.00
                                                                                       1080.08                  2.35
           TOTAL FOR CYCLE                           MEAN:    5.655            30.02
                                                  STD DEV:    0.631

           LBS POLLUTANT/1K LB FUEL/CYCLE            MEAN:    5.249
                                                  STD DEV:    0.703

           LBS POLLUTANT/1K LB TH-HR/CYCLE           MEAN:    3.723
                                                  STD DEV:    0.415

           LBS POLLUTANT/1000K LB TH-HR AT T.O.      MEAN:   84.697
                                                  STD DEV:   11.967
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MODEL  JT8D UNOIL SMOKELESS  SAMPLE NUMBER =  18.

MODE                EMISSION   FUEL       TIME IN   CO       FUEL      LB CO /      ENERGY    LB CO /
                    RATE       RATE       MODE      MASS     MASS      1K LB FUEL   # TH-HR   # TH-HR
                    LB/HR      LB/HR      MIN.      LBS.     LBS.

TAXI-IDLE  MEAN     24.677     1134.241   19.00     5.212    359.18    22.234       413.25    0.01261
           STD DEV  10.147      107.287    0.0      2.143     33.97     9.223         1.11    0.00519

TAKEOFF    MEAN      5.617     8677.555    0.70     0.066    101.24     0.648       169.17    0.00039
           STD DEV   1.997      210.983    0.0      0.023      2.45     0.237         0.11    0.00014

CLIMBOUT   MEAN      6.204     7171.270    2.20     0.227    262.95     0.867       451.92    0.00050
           STD DEV   1.928      160.470    0.0      0.071      5.88     0.274         0.94    0.00016

APPROACH   MEAN     11.960     3572.512    4.00     0.797    238.17     3.420       386.67    0.00206
           STD DEV   4.937      452.440    0.0      0.329     30.16     1.486         0.59    0.00085

TAXI-IDLE  MEAN     24.677     1134.241    7.00     1.920    132.33    22.234       152.25    0.01261
           STD DEV  10.147      107.287    0.0      0.790     12.52     9.223         0.12    0.00519

           TOTAL FOR CYCLE                 MEAN:    8.223   1093.86                 1573.25
                                        STD DEV:    3.201     66.40                    1.68

           LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:    7.610
                                             STD DEV:    3.020

           LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:    5.227
                                             STD DEV:    2.034

           LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:   0.452
                                             STD DEV:    0.161

MODE                EMISSION   FUEL       TIME IN   HC       FUEL      LB HC /      ENERGY    LB HC /
                    RATE       RATE       MODE      MASS     MASS      1K LB FUEL   # TH-HR   # TH-HR
                    LB/HR      LB/HR      MIN.      LBS.     LBS.

TAXI-IDLE  MEAN      5.422     1134.241   19.00     1.145    359.18     5.013       413.25    0.00277
           STD DEV   7.066      107.287    0.0      1.492     33.97     7.130         1.11    0.00361

TAKEOFF    MEAN      0.381     8677.555    0.70     0.004    101.24     0.044       169.17    0.00003
           STD DEV   0.840      210.983    0.0      0.010      2.45     0.097         0.11    0.00006

CLIMBOUT   MEAN      0.396     7171.270    2.20     0.015    262.95     0.055       451.92    0.00003
           STD DEV   0.736      160.470    0.0      0.027      5.88     0.098         0.94    0.00006

APPROACH   MEAN      0.850     3572.512    4.00     0.057    238.17     0.224       386.67    0.00015
           STD DEV   0.913      452.440    0.0      0.061     30.16     0.195         0.59    0.00016

TAXI-IDLE  MEAN      5.422     1134.241    7.00     0.422    132.33     5.013       152.25    0.00277
           STD DEV   7.066      107.287    0.0      0.550     12.52     7.130         0.12    0.00361

           TOTAL FOR CYCLE                 MEAN:    1.643   1093.86                 1573.25
                                        STD DEV:    2.045     66.40                    1.68

           LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:    1.538
                                             STD DEV:    2.025

           LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:    1.044
                                             STD DEV:    1.300

           LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:   0.307
                                             STD DEV:    0.676

MODE                EMISSION   FUEL       TIME IN   NOX      FUEL      LB NOX/      ENERGY    LB NOX/
                    RATE       RATE       MODE      MASS     MASS      1K LB FUEL   # TH-HR   # TH-HR
                    LB/HR      LB/HR      MIN.      LBS.     LBS.

TAXI-IDLE  MEAN      2.908     1134.241   19.00     0.614    359.18     2.584       413.25    0.00149
           STD DEV   0.708      107.287    0.0      0.150     33.97     0.718         1.11    0.00036

TAKEOFF    MEAN    133.295     8677.555    0.70     1.555    101.24    15.344       169.17    0.00919
           STD DEV  33.587      210.983    0.0      0.392      2.45     3.825         0.11    0.00232

CLIMBOUT   MEAN     86.972     7171.270    2.20     3.189    262.95    12.111       451.92    0.00706
           STD DEV  19.477      160.470    0.0      0.714      5.88     2.631         0.94    0.00158

APPROACH   MEAN     20.242     3572.512    4.00     1.349    238.17     5.663       386.67    0.00349
           STD DEV   5.826      452.440    0.0      0.388     30.16     1.509         0.59    0.00100

TAXI-IDLE  MEAN      2.908     1134.241    7.00     0.226    132.33     2.584       152.25    0.00149
           STD DEV   0.708      107.287    0.0      0.055     12.52     0.718         0.12    0.00036

           TOTAL FOR CYCLE                 MEAN:    6.934   1093.86                 1573.25
                                        STD DEV:    1.607     66.40                    1.68

           LBS POLLUTANT/1K LB FUEL/CYCLE       MEAN:    6.348
                                             STD DEV:    1.538

           LBS POLLUTANT/1K LB TH-HR/CYCLE      MEAN:    4.407
                                             STD DEV:    1.022

           LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN: 107.249
                                             STD DEV:   27.024
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MODEL  JT8D DIL REGULAR      SAMPLE NUMBER =   7.


MODE                 EMISSION      FUEL       TIME IN       CO          FUEL       LB CO /     ENERGY      LB CO /
                       RATE        RATE        MODE        MASS         MASS     1K LB FUEL   # TH-HR     # TH-HR
                      LB/HR       LB/HR        MIN.        LBS.         LBS.


TAXI-IDLE   MEAN     42.965     1158.716      19.00       9.075       366.93       37.890      399.00     0.02274
            STD DEV  10.107      210.721      0.0         2.135        66.73        9.093        0.0      0.00535

TAKEOFF     MEAN     18.544     8407.422       0.70       0.216        98.09        2.224      163.33     0.00132
            STD DEV  15.916      181.373      0.0         0.186         2.12        1.961        0.0      0.00114

CLIMBOUT    MEAN     19.403     7098.539       2.20       0.711       260.28        2.759      436.33     0.00163
            STD DEV  14.506      179.837      0.0         0.532         6.60        2.135        0.0      0.00122

APPROACH    MEAN     32.325     3458.895       4.00       2.155       230.59        9.468      373.33     0.00577
            STD DEV   9.911      208.301      0.0         0.661        13.89        3.253        0.0      0.00177

TAXI-IDLE   MEAN     42.965     1158.716       7.00       3.343       135.18       37.890      147.00     0.02274
            STD DEV  10.107      210.721      0.0         0.786        24.58        9.093        0.10     0.00535

          TOTAL FOR CYCLE                         MEAN:  15.501      1091.07                  1519.00
                                              STD DEV:    3.356       105.81                     2.35

          LBS POLLUTANT/1K LB FUEL/CYCLE          MEAN:  14.363
                                              STD DEV:    3.457

          LBS POLLUTANT/1K LB TH-HR/CYCLE         MEAN:  10.205
                                              STD DEV:    2.210

          LBS POLLUTANT/1000K LB TH-HR AT T.O.    MEAN:   1.545
                                              STD DEV:    1.326


MODE                 EMISSION      FUEL       TIME IN       HC          FUEL       LB HC /     ENERGY      LB HC /
                       RATE        RATE        MODE        MASS         MASS     1K LB FUEL   # TH-HR     # TH-HR
                      LB/HR       LB/HR        MIN.        LBS.         LBS.


TAXI-IDLE   MEAN      8.845     1158.716      19.00       1.868       366.93        7.391      399.00     0.00468
            STD DEV   4.791      210.721      0.0         1.012        66.73        3.565        0.0      0.00254

TAKEOFF     MEAN      0.316     8407.422       0.70       0.004        98.09        0.038      163.33     0.00002
            STD DEV   0.321      181.373      0.0         0.004         2.12        0.039        0.0      0.00002

CLIMBOUT    MEAN      0.827     7098.539       2.20       0.030       260.28        0.117      436.33     0.00007
            STD DEV   1.042      179.837      0.0         0.038         6.60        0.146        0.0      0.00009

APPROACH    MEAN      3.343     3458.895       4.00       0.223       230.59        0.977      373.33     0.00060
            STD DEV   2.180      208.301      0.0         0.145        13.89        0.656        0.0      0.00039

TAXI-IDLE   MEAN      8.845     1158.716       7.00       0.688       135.18        7.391      147.00     0.00468
            STD DEV   4.791      210.721      0.0         0.373        24.58        3.565        0.10     0.00254

          TOTAL FOR CYCLE                         MEAN:   2.813      1091.07                  1519.00
                                              STD DEV:    1.495       105.81                     2.35

          LBS POLLUTANT/1K LB FUEL/CYCLE          MEAN:   2.533
                                              STD DEV:    1.281

          LBS POLLUTANT/1K LB TH-HR/CYCLE         MEAN:   1.852
                                              STD DEV:    0.984

          LBS POLLUTANT/1000K LB TH-HR AT T.O.    MEAN:   0.263
                                              STD DEV:    0.268


MODE                 EMISSION      FUEL       TIME IN      NOX          FUEL       LB NOX/     ENERGY      LB NOX/
                       RATE        RATE        MODE        MASS         MASS     1K LB FUEL   # TH-HR     # TH-HR
                      LB/HR       LB/HR        MIN.        LBS.         LBS.


TAXI-IDLE   MEAN      4.393     1158.716      19.00       0.928       366.93        3.732      399.00     0.00233
            STD DEV   1.608      210.721      0.0         0.340        66.73        0.923        0.0      0.00085

TAKEOFF     MEAN    151.272     8407.422       0.70       1.765        98.09       18.000      163.33     0.01081
            STD DEV  21.703      181.373      0.0         0.253         2.12        2.561        0.0      0.00155

CLIMBOUT    MEAN    100.144     7098.539       2.20       3.672       260.28       14.116      436.33     0.00842
            STD DEV  19.169      179.837      0.0         0.703         6.60        2.679        0.0      0.00161

APPROACH    MEAN     28.048     3458.895       4.00       1.870       230.59        8.128      373.33     0.00501
            STD DEV   3.055      208.301      0.0         0.204        13.89        0.957        0.0      0.00055

TAXI-IDLE   MEAN      4.393     1158.716       7.00       0.342       135.18        3.732      147.00     0.00233
            STD DEV   1.608      210.721      0.0         0.125        24.58        0.923        0.10     0.00085

          TOTAL FOR CYCLE                         MEAN:   9.576      1091.07                  1519.00
                                              STD DEV:    1.077       105.81                     2.35

          LBS POLLUTANT/1K LB FUEL/CYCLE          MEAN:   7.913
                                              STD DEV:    1.121

          LBS POLLUTANT/1K LB TH-HR/CYCLE         MEAN:   5.646
                                              STD DEV:    0.709

          LBS POLLUTANT/1000K LB TH-HR AT T.O.    MEAN: 126.060
                                              STD DEV:   18.086
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MODEL  JT8D OIL SMOKELESS    SAMPLE NUMBER =  26.

MODE                  EMISSION    FUEL        TIME IN      CO        FUEL       LB CO /      ENERGY     LB CO /
                        RATE      RATE         MODE       MASS       MASS      1K LB FUEL    # TH-HR    # TH-HR
                       LB/HR      LB/HR        MIN.       LBS.       LBS.

TAXI-IDLE  MEAN       31.429    1216.623      19.00      6.638     385.26       25.841      413.25     0.01597
           STD DEV    13.034      51.803       0.0       2.753      16.43        9.996       14.59     0.00623

TAKEOFF    MEAN        7.490    8754.512       0.70      0.087     102.14        0.855      169.17     0.00052
           STD DEV     5.447     375.860       0.0       0.064       4.38        0.629        5.95     0.00038

CLIMBOUT   MEAN        8.892    7336.766       2.20      0.326     269.01        1.214      451.91     0.00072
           STD DEV     4.848     266.697       0.0       0.178       9.77        0.671       15.92     0.00040

APPROACH   MEAN       18.184    3408.656       4.00      1.212     227.24        5.335      386.67     0.00313
           STD DEV     6.147     167.198       0.0       0.410      11.15        1.758       13.61     0.00105

TAXI-IDLE  MEAN       31.429    1216.623       7.00      2.446     141.94       25.841      152.25     0.01597
           STD DEV    13.034      51.803       0.0       1.014       6.05        9.996        5.36     0.00623

           TOTAL FOR CYCLE                    MEAN:     10.710    1125.60                  1573.25
                                           STD DEV:      3.974      39.53                    55.33

           LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:      9.494
                                           STD DEV:      3.308

           LBS POLLUTANT/1K LB TH-HR/CYCLE    MEAN:      6.775
                                           STD DEV:      2.372

           LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:   0.604
                                           STD DEV:      0.442


MODE                  EMISSION    FUEL        TIME IN      HC        FUEL       LB HC /      ENERGY     LB HC /
                        RATE      RATE         MODE       MASS       MASS      1K LB FUEL    # TH-HR    # TH-HR
                       LB/HR      LB/HR        MIN.       LBS.       LBS.

TAXI-IDLE  MEAN        5.126    1216.623      19.00      1.083     385.26        4.234      413.25     0.00262
           STD DEV     2.307      51.803       0.0       0.487      16.43        1.903       14.59     0.00118

TAKEOFF    MEAN        0.778    8754.512       0.70      0.009     102.14        0.087      169.17     0.00005
           STD DEV     1.094     375.860       0.0       0.013       4.38        0.122        5.95     0.00007

CLIMBOUT   MEAN        0.921    7336.766       2.20      0.034     269.01        0.124      451.91     0.00007
           STD DEV     0.994     266.697       0.0       0.036       9.77        0.134       15.92     0.00008

APPROACH   MEAN        1.753    3408.656       4.00      0.117     227.24        0.515      386.67     0.00030
           STD DEV     0.884     167.198       0.0       0.059      11.15        0.262       13.61     0.00015

TAXI-IDLE  MEAN        5.126    1216.623       7.00      0.399     141.94        4.234      152.25     0.00262
           STD DEV     2.307      51.803       0.0       0.180       6.05        1.903        5.36     0.00118

           TOTAL FOR CYCLE                    MEAN:      1.641    1125.60                  1573.25
                                           STD DEV:      0.720      39.53                    55.33

           LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:      1.461
                                           STD DEV:      0.640

           LBS POLLUTANT/1K LB TH-HR/CYCLE    MEAN:      1.043
                                           STD DEV:      0.457

           LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:   0.613
                                           STD DEV:      0.862


MODE                  EMISSION    FUEL        TIME IN      NOX       FUEL       LB NOX/      ENERGY     LB NOX/
                        RATE      RATE         MODE       MASS       MASS      1K LB FUEL    # TH-HR    # TH-HR
                       LB/HR      LB/HR        MIN.       LBS.       LBS.

TAXI-IDLE  MEAN        4.596    1216.623      19.00      0.971     385.26        3.796      413.25     0.00235
           STD DEV     1.524      51.803       0.0       0.322      16.43        1.263       14.59     0.00077

TAKEOFF    MEAN      197.742    8754.512       0.70      2.307     102.14       22.513      169.17     0.01360
           STD DEV    35.161     375.860       0.0       0.410       4.38        3.393        5.95     0.00211

CLIMBOUT   MEAN      131.017    7336.766       2.20      4.804     269.01       17.822      451.91     0.01061
           STD DEV    19.775     266.697       0.0       0.725       9.77        2.333       15.92     0.00140

APPROACH   MEAN       30.850    3408.656       4.00      2.057     227.24        9.055      386.67     0.00532
           STD DEV     4.724     167.198       0.0       0.315      11.15        1.307       13.61     0.00081

TAXI-IDLE  MEAN        4.596    1216.623       7.00      0.358     141.94        3.796      152.25     0.00235
           STD DEV     1.524      51.803       0.0       0.119       6.05        1.263        5.36     0.00077

           TOTAL FOR CYCLE                    MEAN:     10.496    1125.60                  1573.25
                                           STD DEV:      1.547      39.53                    55.33

           LBS POLLUTANT/1K LB FUEL/CYCLE     MEAN:      9.320
                                           STD DEV:      1.291

           LBS POLLUTANT/1K LB TH-HR/CYCLE    MEAN:      6.662
                                           STD DEV:      0.880

           LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN: 158.640
                                           STD DEV:     24.647
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MODEL  JT9D               SAMPLE NUMBER =   9.

MODE                  EMISSION     FUEL       TIME IN      CO         FUEL       LB CO /     ENERGY      LB CO /
                        RATE       RATE        MODE       MASS        MASS     1K LB FUEL   # TH-HR     # TH-HR
                       LB/HR       LB/HR       MIN.       LBS.        LBS.

TAXI-IDLE   MEAN      78.415    2294.865     19.00      16.563      726.71      34.027     1483.32     0.01120
            STD DEV   16.204     207.822      0.0        3.422       65.82       5.209       35.13     0.00252

TAKEOFF     MEAN       8.291   17052.313      0.70       0.097      198.94       0.487      520.46     0.00019
            STD DEV    5.363     821.375      0.0        0.063        9.58       0.320       12.30     0.00012

CLIMBOUT    MEAN      11.741   14316.879      2.20       0.430      524.95       0.823     1390.38     0.00031
            STD DEV    3.670     820.809      0.0        0.135       30.09       0.264       32.86     0.00010

APPROACH    MEAN      32.570    5203.895      4.00       2.171      346.93       6.419      892.22     0.00243
            STD DEV   11.269     468.229      0.0        0.751       31.21       2.808       21.14     0.00080

TAXI-IDLE   MEAN      78.415    2294.865      7.00       6.102      267.73      34.027      546.49     0.01120
            STD DEV   16.204     207.822      0.0        1.261       24.24       5.209       12.92     0.00252

          TOTAL FOR CYCLE                    MEAN:     25.363     2065.26                 4832.86
                                         STD DEV:      4.698      152.07                  114.19

          LBS POLLUTANT/1K LB FUEL/CYCLE      MEAN:     12.258
                                         STD DEV:      1.886

          LBS POLLUTANT/1K LB TH-HR/CYCLE     MEAN:      5.263
                                         STD DEV:      1.062

          LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:    0.218
                                         STD DEV:      0.143


MODE                  EMISSION     FUEL       TIME IN      HC         FUEL       LB HC /     ENERGY      LB HC /
                        RATE       RATE        MODE       MASS        MASS     1K LB FUEL   # TH-HR     # TH-HR
                       LB/HR       LB/HR       MIN.       LBS.        LBS.

TAXI-IDLE   MEAN      11.359    2294.865     19.00       2.399      726.71       4.963     1483.32     0.00162
            STD DEV    3.099     207.822      0.0        0.655       65.82       1.304       35.13     0.00045

TAKEOFF     MEAN       2.953   17052.313      0.70       0.034      198.94       0.173      520.46     0.00007
            STD DEV    2.215     821.375      0.0        0.026        9.58       0.131       12.30     0.00005

CLIMBOUT    MEAN       2.647   14316.879      2.20       0.097      524.95       0.184     1390.38     0.00007
            STD DEV    1.806     820.809      0.0        0.066       30.09       0.127       32.86     0.00005

APPROACH    MEAN       2.997    5203.895      4.00       0.200      346.93       0.590      892.22     0.00022
            STD DEV    1.376     468.229      0.0        0.092       31.21       0.288       21.14     0.00010

TAXI-IDLE   MEAN      11.359    2294.865      7.00       0.884      267.73       4.965      546.49     0.00162
            STD DEV    3.099     207.822      0.0        0.241       24.24       1.304       12.92     0.00045

          TOTAL FOR CYCLE                    MEAN:      3.615     2065.26                 4832.86
                                         STD DEV:      0.881      152.07                  114.19

          LBS POLLUTANT/1K LB FUEL/CYCLE      MEAN:      1.756
                                         STD DEV:      0.431

          LBS POLLUTANT/1K LB TH-HR/CYCLE     MEAN:      0.749
                                         STD DEV:      0.186

          LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:    0.779
                                         STD DEV:      0.587


MODE                  EMISSION     FUEL       TIME IN      NOX        FUEL       LB NOX/     ENERGY      LB NOX/
                        RATE       RATE        MODE       MASS        MASS     1K LB FUEL   # TH-HR     # TH-HR
                       LB/HR       LB/HR       MIN.       LBS.        LBS.

TAXI-IDLE   MEAN      10.323    2294.865     19.00       2.180      726.71       4.535     1483.32     0.00147
            STD DEV    2.594     207.822      0.0        0.548       65.82       1.198       35.13     0.00036

TAKEOFF     MEAN     719.951   17052.313      0.70       8.399      198.94      41.990      520.46     0.01617
            STD DEV  151.642     821.375      0.0        1.769        9.58       7.069       12.30     0.00359

CLIMBOUT    MEAN     458.604   14316.879      2.20      16.815      524.95      31.892     1390.38     0.01212
            STD DEV   81.739     820.809      0.0        2.997       30.09       4.201       32.86     0.00233

APPROACH    MEAN      54.101    5203.895      4.00       3.607      346.93      10.457      892.22     0.00404
            STD DEV    5.727     468.229      0.0        0.382       31.21       1.323       21.14     0.00044

TAXI-IDLE   MEAN      10.323    2294.865      7.00       0.803      267.73       4.535      546.49     0.00147
            STD DEV    2.594     207.822      0.0        0.202       24.24       1.198       12.92     0.00036

          TOTAL FOR CYCLE                    MEAN:     31.805     2065.26                 4832.86
                                         STD DEV:      5.075      152.07                  114.19

          LBS POLLUTANT/1K LB FUEL/CYCLE      MEAN:     15.386
                                         STD DEV:      1.952

          LBS POLLUTANT/1K LB TH-HR/CYCLE     MEAN:      6.593
                                         STD DEV:      1.135

          LBS POLLUTANT/1000K LB TH-HR AT T.O.  MEAN:  188.690
                                         STD DEV:     41.875
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MODEL  SPEY MK/511          SAMPLE NUMBER =   4.


MODE                  EMISSION     FUEL       TIME IN       CO         FUEL      LB CO /     ENERGY     LB CO /
                        RATE       RATE        MODE        MASS        MASS     1K LB FUEL  # TH-HR    # TH-HR
                       LB/HR      LB/HR        MIN.        LBS.        LBS.


TAXI-IDLE   MEAN      72.437    1088.944      19.00       11.469      344.83      66.737     288.80    0.03971
            STD DEV   19.468      30.210      0.0          3.082        9.55      18.639       0.0     0.01067

TAKEOFF     MEAN      14.218    7625.230       0.70        0.166       88.96       1.870     133.00    0.00125
            STD DEV    2.944     150.022      0.0          0.034        1.75       0.426       0.25    0.00026

CLIMBOUT    MEAN      15.251    6354.934       2.20        0.559      233.01       2.401     355.30    0.00157
            STD DEV    1.804      60.839      0.0          0.066        2.24       0.298       0.0     0.00019

APPROACH    MEAN      39.068    3051.668       4.00        2.605      203.44      12.868     304.00    0.00857
            STD DEV   10.078     123.028      0.0          0.672        8.21       3.550       0.0     0.00221

TAXI-IDLE   MEAN      72.437    1088.944       7.00        4.226      127.04      66.737     106.40    0.03971
            STD DEV   19.468      30.210      0.0          1.136        3.52      18.639       0.06    0.01067

          TOTAL FOR CYCLE                          MEAN:  19.024      997.30                 1187.50
                                               STD DEV:    4.775       19.84                    0.0

          LBS POLLUTANT/1K LB FUEL/CYCLE           MEAN:  19.117
                                               STD DEV:    4.932

          LBS POLLUTANT/1K LB TH-HR/CYCLE          MEAN:  16.021
                                               STD DEV:    4.021

          LBS POLLUTANT/1000K LB TH-HR AT T.O.     MEAN:   1.455
                                               STD DEV:    0.301


MODE                  EMISSION     FUEL       TIME IN       HC         FUEL      LB HC /     ENERGY     LB HC /
                        RATE       RATE        MODE        MASS        MASS     1K LB FUEL  # TH-HR    # TH-HR
                       LB/HR      LB/HR        MIN.        LBS.        LBS.


TAXI-IDLE   MEAN      32.473    1088.944      19.00        5.142      344.83      30.000     288.80    0.01780
            STD DEV   17.225      30.210      0.0          2.727        9.55      16.121       0.0     0.00944

TAKEOFF     MEAN       0.0      7625.230       0.70        0.0         88.96       0.0       133.00    0.0
            STD DEV    0.0       150.022      0.0          0.0          1.75       0.0         0.25    0.0

CLIMBOUT    MEAN       0.242    6354.934       2.20        0.009      233.01       0.038     355.30    0.00003
            STD DEV    0.221      60.839      0.0          0.008        2.24       0.035       0.0     0.00002

APPROACH    MEAN       4.224    3051.668       4.00        0.282      203.44       1.394     304.00    0.00093
            STD DEV    4.447     123.029      0.0          0.296        8.21       1.451       0.0     0.00098

TAXI-IDLE   MEAN      32.473    1088.944       7.00        1.894      127.04      30.000     106.40    0.01780
            STD DEV   17.225      30.210      0.0          1.005        3.52      16.121       0.06    0.00944

          TOTAL FOR CYCLE                          MEAN:   7.326      997.30                 1187.50
                                               STD DEV:    4.017       19.84                    0.0

          LBS POLLUTANT/1K LB FUEL/CYCLE           MEAN:   7.372
                                               STD DEV:    4.055

          LBS POLLUTANT/1K LB TH-HR/CYCLE          MEAN:   6.170
                                               STD DEV:    3.382

          LBS POLLUTANT/1000K LB TH-HR AT T.O.     MEAN:   0.0
                                               STD DEV:    0.0


MODE                  EMISSION     FUEL       TIME IN      NOX         FUEL      LB NOX/     ENERGY     LB NOX/
                        RATE       RATE        MODE        MASS        MASS     1K LB FUEL  # TH-HR    # TH-HR
                       LB/HR      LB/HR        MIN.        LBS.        LBS.


TAXI-IDLE   MEAN       2.493    1088.944      19.00        0.395      344.83       2.289     288.80    0.00137
            STD DEV    0.597      30.210      0.0          0.094        9.55       0.546       0.0     0.00033

TAKEOFF     MEAN     153.012    7625.230       0.70        1.785       88.96      20.081     133.00    0.01342
            STD DEV    9.845     150.022      0.0          0.115        1.75       1.519       0.25    0.00086

CLIMBOUT    MEAN     114.759    6354.934       2.20        4.208      233.01      18.073     355.30    0.01184
            STD DEV   13.724      60.839      0.0          0.503        2.24       2.316       0.0     0.00142

APPROACH    MEAN      30.446    3051.669       4.00        2.030      203.44       9.939     304.00    0.00668
            STD DEV    5.197     123.029      0.0          0.346        8.21       1.331       0.0     0.00114

TAXI-IDLE   MEAN       2.493    1088.944       7.00        0.145      127.04       2.289     106.40    0.00137
            STD DEV    0.597      30.210      0.0          0.035        3.52       0.546       0.06    0.00033

          TOTAL FOR CYCLE                          MEAN:   9.563      997.30                 1187.50
                                               STD DEV:    0.910       19.84                    0.0

          LBS POLLUTANT/1K LB FUEL/CYCLE           MEAN:   8.575
                                               STD DEV:    0.758

          LBS POLLUTANT/1K LB TH-HR/CYCLE          MEAN:   7.211
                                               STD DEV:    0.766

          LBS POLLUTANT/1000K LB TH-HR AT T.O.     MEAN: 156.591
                                               STD DEV:   10.075
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